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## **A MESSAGE AND PROGRAM SYSTEM SUPPORTING COMMUNICATION**

### **TECHNICAL FIELD**

This invention relates to a messaging communication method and program system supporting communication between patients and physicians, physician  
10 extenders including nurses, and the ordering of prescriptions, alternatively supporting communication between clients, service providers, service extenders including service assistants and the ordering of services.

### **DESCRIPTION OF THE PRIOR ART**

15 Figure 1 depicts prior art human-computer interfaces capable of supporting messaging upon communications networks. One exemplary prior art computer system includes a display screen 2 in an enclosure 4, audio speakers 6 and 8, a second enclosure 10 housing a removable media drive 12. Keyboard 14 is interfaced via physical transport mechanism 16 to the computer. Selector device  
20 18 is interfaced via physical transport mechanism 20 to the computer. Audio microphone 22 is interfaced via physical transport mechanism 24 to the computer. The computer system interfaces via physical transport mechanism 30 to network 32.

Certain exemplary prior art handheld computer interfaces are often single  
25 enclosures 40 incorporating a miniature display screen 42 with buttons 44 and a pointing device 46. The computer enclosure 40 is often held in one hand, while the pointing device 46 is held with the other hand. Wireless communications port 48 can both transmit 50 signals and receive 38 signals transmitted by wireless transceiver interface 36, which interfaces to network 32 via physical transport

- 5 mechanism 34. Other exemplary uses of such devices include mounting enclosure 40 on a wrist- or arm-band, thus freeing one hand.

Other exemplary prior art computer systems include but are not limited to devices incorporating one or more audio speakers such as 6 or 8, at least one audio microphone 22, which may or may not possess a display screen 2, but often  
10 possess a miniature display screen 42 and often several buttons 44 or keyboard 14. Cellular telephones, both hand held and vehicle-mounted, possessing all these features are readily available connecting to either local wireless networks or larger national and international networks, in some cases through orbiting satellite transceivers 36, which use separate carriers 34 to further interface to  
15 ground base stations which provide high bandwidth gateways to large Wide Area Networks (WANs), including the Internet and the World Wide Web.

These exemplary devices are often capable of receiving messages, such as e-mail and paging messages. Many of these exemplary devices are capable of audio exchanges in a fashion similar to a telephone with a telephone messaging  
20 center. Many of these exemplary devices may further support the loading and adding of programs to provide upgraded services and new service capabilities. Many of these systems possess the ability to retain such loaded or added programs after the power to the module has been turned off.

Such devices have been used to further provide a communication avenue  
25 between patients and physicians, through email and paging-style messages. Paging a doctor with a short message such as "Water has broken" may give an adequate portrayal of some situations such as the imminence of labor in childbirth. However, such a messaging system could not adequately portray the circumstances regarding a potential breach birth.

30 Traditional telephones have often been used to permit a physician and patient to communicate. However, there are problems with such devices. Telephones without answering or message centers require that both patient and physician be

5 available at essentially the same time, which is often difficult to arrange. Telephones, even with messaging centers, still have problems. Often the stored messages are short in duration. Even when the messages may be quite long, patients do not tend to give concise, clear and complete verbal medical descriptions of exactly the relevant conditions needed to describe their medical  
10 condition. This leads to a situation of question and answers, often with the patient and/or doctor having to wait significant amounts of time between each "bounce" before there is enough information in front of the physician to respond with a consultation. Further, physicians must listen through their patients messages, often wasting time trying to sort through the words to determine the observed  
15 medical conditions. This is an inefficient use of the physicians' time.

Email exchanges between patients and physicians can provide greater amounts of information. However, there is a tendency to waste both patient and doctor time for several reasons. First, patients do not tend to write concise, clear and complete medical descriptions of exactly the relevant conditions needed to  
20 describe their medical condition. This is understandable, most people are not trained enough at medicine to know what a physician will need to know. This again leads to question and answer situations, often with the patient and doctor having to wait significant amounts of time between each "bounce" before there is enough information in front of the physician to respond with a consultation.  
25 Further, physicians must read what their patients have written, often wasting time trying to sort through the words to determine the observed medical conditions. This is an inefficient use of the physicians' time.

The devices mentioned above have also been used to further provide a communication avenue between clients and service providers for various kinds of  
30 service support, through email and paging-style messages. Brief messages such as "flat tire" may convey adequate information in some circumstances but would be fundamentally inadequate in situations based around mission critical technologies such as aircraft.

5 Consider a commonly occurring scenario in the airline industry. A technician in an isolated location finds an intermittent failure in testing a system possessing electromechanical, fluidic and airfoil control components, by way of example. The determination of the proper course of action involves decisions regarding each of these areas of the aircraft's technologists, combined with an  
10 understanding of the reliability history of the system involved and the relevant government and airline regulations. Client such as the local airport technician need access to high level, integrated service provider responses.

Traditional telephones have often been used to permit a service provider and client to communicate. However, there are problems with such devices.

15 Telephones without answering or message centers require that both client and service provider be available at essentially the same time, which is often difficult to arrange or involve the clients waiting for extended periods of time "on hold". Telephones, even with messaging centers, still have problems. Often the stored messages are short in duration. Even when the messages may be quite long,  
20 clients do not tend to give concise, clear and complete verbal service descriptions of exactly the relevant conditions needed to describe their service condition. This leads to a situation of question and answers, often with the client and/or doctor having to wait significant amounts of time between each "bounce" before there is enough information in front of the service provider to respond with  
25 a consultation. Also, the expertise of the service providers may vary greatly, making the omission of specific questions possible, limiting the utility of the direct contact. Further, service providers must listen through their clients messages, often wasting time trying to sort through the words to determine the observed service conditions. This is an inefficient use of the service providers' time.

30 Email exchanges between clients and service providers can provide greater amounts of information. However, there is a tendency to waste both client and doctor time for several reasons. First, clients do not tend to write concise, clear and complete service descriptions of exactly the relevant conditions needed to

5 describe their service condition. This is understandable, most people are not trained enough in the service area's technology to know what a service provider will need to know. This again leads to question and answer situations, often with the client and doctor having to wait significant amounts of time between each "bounce" before there is enough information in front of the service provider to  
10 respond with a consultation. Further, service providers must read what their clients have written, often wasting time trying to sort through the words to determine the observed service conditions. This is an inefficient use of the service providers' time.

Figure 2 depicts a generic prior art block of a messaging communications system supporting the online ordering of prescriptions by physicians interacting with pharmacies. Email and other messaging systems have been used to provide a limited form of automation for the placing of prescription orders with various pharmacies possessing online message capabilities. Physician **100** interacts **102**  
15 with a physician-operated computer **104**, which may be a desktop, notebook, or handheld computer, possibly embedded in a cellular telephone. The physician operated computer **104** sends a specialized message, a prescription ordering message, using physical transport mechanism **106** to a network **108**, which is controlled and accessed **110** by network server **112**. Network server **112** accesses **114** medical databases and patient database **116**. Network server **112**  
20 then sends a specialized pharmaceutical order message to a pharmacy computer **120** which is linked **118** to the same network **110**.

There is a central problem with such systems. The patient is not part of the interaction. The patient cannot choose whether to order the prescription. The patient cannot choose which pharmacy or where the pharmacy sends the  
30 prescription, or whether a traditional brick and mortar pharmacy is preferred. The patient cannot choose between different brands.

## **Summary of the Invention**

One aspect of this invention embodies a method of messaging upon a network involving at least one physician, at least one patient and a workflow engine. Each physician operates a computer, which from time to time is capable of receiving and sending messages upon the network at a corresponding address on the network. Each patient operates a computer, which from time to time, is capable of receiving and sending messages upon the network at a corresponding address on the network. The workflow engine accesses the network for receiving and sending messages upon the network using at least one workflow engine address on the network. The method comprises using a first medical message wizard by the patient on the patient operated computer, a medical profiler process performed by the workflow engine and a second medical message wizard by the first physician on the physician operated computer at the first corresponding physician address.

Using the first medical message wizard by the patient is further comprised of generating an educated query message and sending the educated query message to the medical profiler address. Performing the medical profiler process by the workflow engine is further comprised of receiving the educated query message at the medical profiler address; processing the received educated query message; generating a patient message log entry in a medical profile of the patient; generating a patient medical query message; sending the patient medical query message to a first physician with the corresponding physician address. Using the second medical message wizard by the first physician is further comprised of receiving the patient medical query message; processing the patient medical query message; generating a physician-viewable patient medical query message; and displaying a physician-viewable patient medical query message.

5 This embodiment of the invention has several advantageous characteristics: It minimizes the need for extensive typing for the patient. It decreases the need for message "ping-pong" between patient and physician due to insufficient information in the patient's messages to the physician. It allows the physician to read in an optimized format, which minimizes the physician's reading time. In  
10 many cases, the physician will not need to poll a chart pool, because the medical profile will cover the required information. There is no need for phone tag with patients.

15 A further aspect of this invention involves further embodiments of the first messaging wizard, medical profiler process and second messaging wizard. The second medical message wizard further comprises responding to the physician-viewable patient medical query message; generating a patient response message; sending the patient response message; and copying the patient response message with an appended physician billing data to the workflow  
20 engine. Responding to the physician-viewable patient medical query message creates a first-physician response. Generating a patient response message from the physician-viewable patient medical query message and the first-physician response. Sending the patient response message to the patient at the corresponding patient address.

25 The medical profiler process further comprises: receiving the copied patient response message with the appended physician billing data; processing the received, copied patient response message with the appended physician billing data; generating a patient response log entry in the medical profile of the patient. Processing the received, copied patient response message with the appended  
30 physician billing data creates a processed, received, copied patient response message with the appended physician billing data. The generating a patient response log entry in the medical profile of the patient is from the processed,

5 received, copied patient response message with the appended physician billing data.

The first message wizard further comprises: receiving the patient response message; processing the received patient response message to create a processed, received patient response message; and displaying the processed,  
10 received patient response message.

This aspect of the invention is advantageous for several reasons. It supports the physician responding to the optimized educated query of the patient. It supports the automated logging of physician responses with billing information at the workflow engine. It supports the patient receiving the physician's response.

15 Further embodiments of this invention advantageously support the use of authentication keys insuring secure communications between patient and workflow engine, between patient and physician and between physician and workflow engine.

Further embodiments of this invention advantageously support physician  
20 extenders, including nurses, physician assistants and administrators.

Further embodiments of this invention advantageously support prescriptions involving, not only the physician, workflow engine and pharmacy, but also the patient. This is advantageous for several reasons. The patient takes part in the prescription-ordering interaction. The patient can choose whether to order the  
25 prescription. The patient can choose which pharmacy to purchase the prescription from. The patient can choose where the pharmacy sends the prescription. The patient can choose whether a traditional brick and mortar pharmacy is preferred. The patient can choose between different brands.

Another aspect of this invention embodies a computer program residing on a  
30 computer readable medium accessible by the patient operated computer capable



5 of receiving patient response messages and sending messages to a workflow engine. It includes code for receiving the patient response message with an embedded prescription; code for displaying the received patient response message; code for responding to the patient response message; code for sending the patient prescription message to the workflow engine. The code for  
10 responding to the patient response message further includes code for generating a patient prescription message from the embedded prescription.

This aspect of the invention is advantageous for several reasons. The patient takes part in the prescription-ordering interaction. The patient can choose whether to order the prescription. The patient can choose which pharmacy to  
15 purchase the prescription from. The patient can choose where the pharmacy sends the prescription. The patient can choose whether a traditional brick and mortar pharmacy is preferred. The patient can choose between different brands.

Another aspect of this invention embodies a method of messaging upon a network involving at least one service provider, at least one client and a service-  
20 flow engine. Each service provider operates a computer, which from time to time is capable of receiving and sending messages upon the network at a corresponding address on the network. Each client operates a computer, which from time to time, is capable of receiving and sending messages upon the network at a corresponding address on the network. The service-flow engine  
25 accesses the network for receiving and sending messages upon the network using at least one service-flow engine address on the network. The method comprises using a first service message interface by the client on the client operated computer, a service profiler process performed by the service-flow engine and a second service message interface by the first service provider on  
30 the service provider operated computer at the first corresponding service provider address.

5 Using the first service message interface by the client is further comprised of generating an educated query message and sending the educated query message to the service profiler address. Performing the service profiler process by the service-flow engine is further comprised of receiving the educated query message at the service profiler address; processing the received educated query  
10 message; generating a client message log entry in a service profile of the client; generating a client service query message; sending the client service query message to a first service provider with the corresponding service provider address. Using the second service message interface by the first service provider is further comprised of receiving the client service query message;  
15 processing the client service query message; generating a service provider-viewable client service query message; and displaying a service provider-viewable client service query message.

This embodiment of the invention has several advantageous characteristics: It minimizes the need for extensive typing for the client. It decreases the need for  
20 message "ping-pong" between client and service provider due to insufficient information in the client's messages to the service provider. It allows the service provider to read in an optimized format, which minimizes the service provider's reading time. In many cases, the service provider will not need to poll a chart pool, because the service profile will cover the required information. There is no  
25 need for phone tag with clients.

A further aspect of this invention involves further embodiments of the first message interface, service profiler process and second message interface. The second service message interface further comprising responding to the service provider-viewable client service query message; generating a client response  
30 message; sending the client response message; and copying the client response message with an appended service provider billing data to the service-flow engine. Responding to the service provider-viewable client service query message creates a first-service provider response. Generating a client response

5 message from the service provider-viewable client service query message and the first-service provider response. Sending the client response message to the client at the corresponding client address.

The service profiler process further comprises: receiving the copied client response message with the appended service provider billing data; processing  
10 the received, copied client response message with the appended service provider billing data; generating a client response log entry in the service profile of the client. Processing the received, copied client response message with the appended service provider billing data creates a processed, received, copied client response message with the appended service provider billing data. The  
15 generating a client response log entry in the service profile of the client is from the processed, received, copied client response message with the appended service provider billing data.

The first message interface further comprises: receiving the client response message; processing the received client response message to create a  
20 processed, received client response message; and displaying the processed, received client response message.

This aspect of the invention is advantageous for several reasons. It supports the service provider responding to the optimized educated query of the client. It supports the automated logging of service provider responses with billing  
25 information at the service-flow engine. It supports the client receiving the service provider's response.

Further embodiments of this invention advantageously support the use of authentication keys insuring secure communications between client and service-flow engine, between client and service provider and between service provider  
30 and service-flow engine.

5 Further embodiments of this invention advantageously support service extenders, including service assistants, service provider assistants and administrators.

Further embodiments of this invention advantageously supports service recommendations involving the service provider, service-flow engine and  
10 supplier, but also the client. This is advantageous for several reasons. The client takes part in the service recommendation-ordering interaction. The client can choose whether to order the service recommendation. The client can choose which supplier to purchase the service recommendation from. The client can choose where the supplier sends the service recommendation. The client can  
15 choose whether a traditional brick and mortar supplier is preferred. The client can choose between different brands.

Another aspect of this invention embodies a computer program residing on a computer readable medium accessible by the client operated computer capable of receiving client response messages and sending messages to a service-flow  
20 engine. It includes code for receiving the client response message with an embedded service recommendation; code for displaying the received client response message; code for responding to the client response message; code for sending the client service recommendation message to the service-flow engine. The code for responding to the client response message further includes  
25 code for generating a client service recommendation message from the embedded service recommendation.

This aspect of the invention is advantageous for several reasons. The client takes part in the service recommendation-ordering interaction. The client can choose whether to order the recommended service(s). The client can choose  
30 which supplier to purchase the recommended service(s) from. The client can choose where the supplier delivers the recommended service(s). The client can

- 5 choose whether a traditional brick and mortar supplier is preferred. The client can choose between different brands.

These and other advantages of the present invention will become apparent upon reading the following detailed descriptions and studying the various figures of the drawings.

## **Brief Description of the Drawings**

Figure 1 depicts prior art human-computer interface capable of supporting messaging upon communications networks;

Figure 2 depicts a generic prior art block of a messaging communications system supporting the online ordering of prescriptions by physicians interacting with pharmacies;

Figure 3A depicts a flow diagram of an embodiment of the invention in accordance with certain embodiments;

Figure 3B depicts a more detailed flow diagram of an embodiment of the invention in accordance with certain embodiments;

Figure 4 depicts an interactive flow between a patient using a first messaging wizard, medical profiler performing a medical profiler process and physician using a second messaging wizard in accordance with an embodiment of the invention;

Figure 5 depicts a flowchart of operations supporting the generation and sending of an educated query by a patient using the first messaging wizard in accordance with embodiments supporting Figure 4;

Figure 6 depicts a flowchart of operations supporting the reception, processing, logging of the educated query message from the patient, and the generation and sending of the patient medical query message to a physician by the medical profiler process performed by the medical profiler in accordance with embodiments supporting Figure 4;

Figure 7 depicts a flowchart of operations supporting reception, processing and viewing the patient medical query message by the second message wizard for the physician in accordance with embodiments supporting Figure 4;

5 Figure 8 depicts a flowchart of operations supporting reception, generation and sending a patient response message, as well as copying the patient response message with an appended physician billing data to the medical profiler address in accordance with embodiments supporting Figure 4;

Figure 9 depicts a flowchart of operations supporting the reception, processing,  
10 logging the copied patient response message with an appended physician billing data by the medical profiler process performed by the medical profiler in accordance with embodiments supporting Figure 4;

Figure 10 depicts a flowchart of operations supporting reception, processing and display of the patient response message using the first messaging wizard on the  
15 patient operated computer in accordance with embodiments supporting Figure 4;

Figure 11 depicts a flowchart of further details regarding operation 604, generation of an educated query message by the first messaging wizard in accordance with embodiments supporting Figure 5;

Figure 12 depicts a flowchart of further details regarding operation 638,  
20 processing the educated query message using the medical profiler process performed by the medical profiler in accordance with embodiments supporting Figure 6;

Figure 13 depicts a flowchart of further details regarding operation 642, generation of a patient medical query message by the medical profiler process  
25 performed by the medical profiler in accordance with embodiments supporting Figure 6;

Figure 14 depicts a flowchart of further details regarding operation 678, processing the received patient medical query message by the second messaging wizard in accordance with embodiments supporting Figure 7;

5 Figure 15 depicts a flowchart of further details regarding operation 722, copying the patient response message with appended physician billing data to the medical profiler by the second messaging wizard in accordance with embodiments supporting Figure 8;

10 Figure 16 depicts a flowchart of further details regarding operation 748, processing the received, copied the patient response message with appended physician billing data using the medical profiler process performed by the medical profiler in accordance with embodiments supporting Figure 9;

15 Figure 17 depicts a flowchart of further details regarding operation 708, generating patient response message using the second message wizard in accordance with embodiments supporting Figure 8;

Figure 18 depicts a flowchart of further details regarding operation 778, processing the received patient response message using the first message wizard in accordance with embodiments supporting Figure 10;

20 Figure 19 depicts a flowchart of further details regarding operation 712, sending the patient response message with appended physician billing data using the medical profiler process performed by the medical profiler in accordance with embodiments supporting Figure 8;

25 Figure 20 depicts a flowchart of further details regarding operation 708, generating the patient response message using the second message wizard in accordance with embodiments supporting Figure 8;

Figure 21 depicts a flowchart of operations of the medical profiler process performed by the medical profiler in accordance with alternative embodiments supporting Figure 4;

30 Figure 22 depicts a flowchart of further details regarding operation 1048, processing the patient response message destined for the patient using the



- 5 medical profiler process performed by the medical profiler in accordance with  
embodiments supporting Figure 21;

Figure 23 depicts a flowchart of further details regarding operation 642,  
generating a patient medical query message using the medical profiler process  
performed by the medical profiler in accordance with embodiments;

- 10 Figure 24 depicts a flowchart of operations using the third message wizard on the  
physician extender computer in accordance with embodiments supporting Figure  
9;

- 15 Figure 25 depicts a flowchart of further details regarding operation 602,  
generating the physician-viewable patient medical query message in accordance  
with embodiments supporting Figures 7;

Figure 26 depicts a flowchart of further details regarding operation 708,  
generating the patient response message using the second message wizard in  
accordance with embodiments supporting Figure 8;

- 20 Figure 27 depicts a flowchart of further operations embodying the third message  
wizard in accordance with certain embodiments;

Figure 28 depicts a flowchart of further operations embodied in the message  
profiler process in accordance with certain embodiments;

- 25 Figure 29 depicts a flowchart of further operations embodied in a second  
messaging wizard in accordance with certain embodiments supporting  
prescriptions;

Figure 30 depicts a flowchart of further operations embodied in a medical profiler  
in accordance with certain embodiments supporting prescriptions;

5 Figure **30A** depicts a flowchart of further details regarding operation **1311**, integrating a prescription order in the medical profiler process in accordance with embodiments supporting Figure **30**;

Figure **31** depicts a flowchart of further operations embodied in the first messaging wizard in accordance with certain embodiments supporting  
10 prescriptions;

Figure **32** depicts a flowchart of further details of operation **1352**, ordering the embedded prescription of Figure **31**;

Figure **33** depicts a flowchart of further details of operation **1170** of Figure **25**;

Figure **34** depicts a flowchart of further details of operation **1222** of Figure **27**;

15 Figure **35** depicts a flowchart of further details of operation **1402** of Figure **34**;

Figure **36** depicts a flowchart of further operations embodying the message profiler process in accordance with certain embodiments supporting billing patients;

20 Figure **37** depicts a flowchart of further operations embodying the message profiler process in accordance with certain embodiments further supporting billing patients;

Figure **38** depicts a flowchart of further operations embodying a billing process in accordance with certain embodiments;

Figure **39** depicts a flowchart of further details of operation **1518** of Figure **38**;

25 Figure **40** depicts a flowchart of further details of operation **708** of Figure **8** supporting a physician requesting a second opinion in accordance with certain embodiments;

- 5 Figure **41** depicts a flowchart of operations embodied in the second message wizard supporting a second physician and a second opinion request in accordance with certain embodiments;

Figure **42** depicts a flowchart of operations embodied in a second message wizard supporting maintaining a collection of patient response templates in  
10 accordance with certain embodiments;

Figure **43** depicts a flowchart of further details of operation **704** of Figure **8** supporting use of a patient response template to create a first-physician response in accordance with certain embodiments;

Figure **44** depicts a flowchart of operations embodied in a first messaging wizard  
15 to support maintaining a collection of patient problem templates in accordance with certain embodiments;

Figure **45** depicts a flowchart of further details of operation **604** of Figure **5** supporting use of a patient problem template to create an educated medical query using a first medical wizard in accordance with certain embodiments;

20 Figure **46** depicts a flowchart of operations embodied in a medical profiler process to generate and send patient problem templates to patients in accordance with certain embodiments;

Figure **47** depicts a flow diagram of a medical profiler process in accordance with certain embodiments;

25 Figure **48** depicts a flow diagram of a computer program capable of receiving a message from a physician containing a prescription and responding to the message containing the prescription by generating and sending a prescription order message in accordance with certain embodiments in accordance with an aspect of the invention;

Figure **3B** depicts a flow diagram of an embodiment of the invention in accordance with certain embodiments. Patient **200** is the primary initiator of this invention. Arrow **202** depicts the interactions of patient **200** to create the educated query message **204**. The educated query message **204** is an optimized medical query directed by the patient to address concerns and conditions involving the patient. Arrow **206** depicts the sending of educated query message **204** to the medical profile **208** which is managed by the medical profiler process. The workflow engine performs the various medical profiler process operations. More will be said about the workflow engine shortly. Arrow **210** depicts interactive communication between the workflow engine **208** and the physicians **212** primarily regarding the medical profiler. Physicians **212** are the central destination of patient generated educated medical query messages as sent by **210** from the medical profiler process to the physician **212**. Arrow **214** depicts the response of physician **212** to the educated query message, generating a consultative response **216**. Consultation **216** provides the basis of the patient response message **226**. Arrow **218** depicts the inclusion of the physician consultative response **216** with educational material **220**. Educational material **220** is included in certain, but not all cases, to meet mandated regulations as well as provide the physicians a mechanism to distribute standard material regarding various conditions and treatments. Arrow **222** depicts the workflow engine activities required to incorporate the consultative response and included materials **220** with billing information (charging) **224**. Charging **224** performs tasks of notifying a patient medical profile of the consultative transaction, what was the query, response, educational materials included and the medical service expenses. Arrow **226** depicts the actual patent response message derived from **224** query, physician response, educational materials included and the medical service expenses sent to patient **200**.

Arrow **230** depicts the message information flow from the workflow engine to physician extender **232**. Physician extenders **232** perform a number of medical

5 Figure **49** depicts a flowchart of further details of the code of **1854** of Figure **48** supporting receiving a patient response message with an embedded prescription in accordance with certain embodiments; and

Figure **50** depicts a flowchart of further details of the code of **1862** of Figure **48** supporting responding to the patient response message in accordance with  
10 certain embodiments.

Figure **50A** depicts a flowchart of further details of **1311** of Figure **30** supporting integrating a prescription order in accordance with certain embodiments;

Figure **50B** depicts a flowchart of further details of **1324** of Figure **30A** supporting generating a pharmacy prescription order in accordance with certain  
15 embodiments;

Figure **50C** depicts a flowchart of further details of **1326** of Figure **30A** supporting sending a pharmacy prescription order to a pharmacy in accordance with certain  
embodiments;

Figure **50D** depicts a flowchart of further details of **1106** of Figure **23** supporting  
20 determining a routing chain of physician extenders and embedding the routing chain into a second patient query in accordance with certain embodiments;

Figure **50E** depicts a flowchart of further details of **1178** of Figure **24** supporting determining successor physician extenders in an embedded physician extender routing chain, generating a successor medical query message with embedded  
25 proposed patient response and sending the successor patient medical query to the successor physician extender;

Figure **50F** depicts a flowchart of further details of **646** of Figure **6** supporting generating a routing tree of physicians with first physician final destination and source list of physicians, generating and sending a source medical query to each  
30 physician included in the physician source list;

5 Figure 51 depicts a more detailed flow diagram of an embodiment of the invention in accordance with certain embodiments;

Figure 52 depicts an interactive flow between a client using a first message interface, service profiler performing a service profiler process and service provider using a second message interface in accordance with an embodiment of  
10 the invention;

Figure 52A depicts an interactive flow between a client using a first message interface, service profiler performing a service profiler process and service provider using a second message interface in accordance with a further embodiment of the invention;

15 Figure 53 depicts a flowchart of operations supporting the generation and sending of an educated query by a client using the first message interface in accordance with embodiments supporting Figure 52;

Figure 54 depicts a flowchart of operations supporting the reception, processing, logging of the educated query message from the client, and the generation and  
20 sending of the client service query message to a service provider by the service profiler process performed by the service profiler in accordance with embodiments supporting Figure 52;

Figure 55 depicts a flowchart of operations supporting reception, processing and viewing the client service query message by the second message interface for  
25 the service provider in accordance with embodiments supporting Figure 52;

Figure 56 depicts a flowchart of operations supporting reception, generation and sending a client response message, as well as copying the client response message with an appended service provider billing data to the service profiler address in accordance with embodiments supporting Figure 52;

5 Figure 57 depicts a flowchart of operations supporting the reception, processing, logging the copied client response message with an appended service provider billing data by the service profiler process performed by the service profiler in accordance with embodiments supporting Figure 52;

10 Figure 58 depicts a flowchart of operations supporting reception, processing and display of the client response message using the first message interface on the client operated computer in accordance with embodiments supporting Figure 52;

Figure 59 depicts a flowchart of further details regarding operation 2604, generation of an educated query message by the first message interface in accordance with embodiments supporting Figure 53;

15 Figure 60 depicts a flowchart of further details regarding operation 2638, processing the educated query message using the service profiler process performed by the service profiler in accordance with embodiments supporting Figure 54;

20 Figure 61 depicts a flowchart of further details regarding operation 2642, generation of a client service query message by the service profiler process performed by the service profiler in accordance with embodiments supporting Figure 54;

25 Figure 62 depicts a flowchart of further details regarding operation 2678, processing the received client service query message by the second message interface in accordance with embodiments supporting Figure 55;

Figure 63 depicts a flowchart of further details regarding operation 2722, copying the client response message with appended service provider billing data to the service profiler by the second message interface in accordance with embodiments supporting Figure 56;

5 Figure 64 depicts a flowchart of further details regarding operation 2748, processing the received, copied the client response message with appended service provider billing data using the service profiler process performed by the service profiler in accordance with embodiments supporting Figure 57;

10 Figure 65 depicts a flowchart of further details regarding operation 2708, generating client response message using the second message interface in accordance with embodiments supporting Figure 56;

Figure 66 depicts a flowchart of further details regarding operation 2778, processing the received client response message using the first message interface in accordance with embodiments supporting Figure 58;

15 Figure 67 depicts a flowchart of further details regarding operation 2712, sending the client response message with appended service provider billing data using the service profiler process performed by the service profiler in accordance with embodiments supporting Figure 56;

20 Figure 68 depicts a flowchart of further details regarding operation 2708, generating the client response message using the second message interface in accordance with embodiments supporting Figure 56;

Figure 69 depicts a flowchart of operations of the service profiler process performed by the service profiler in accordance with alternative embodiments supporting Figure 52;

25 Figure 70 depicts a flowchart of further details regarding operation 3048, processing the client response message destined for the client using the service profiler process performed by the service profiler in accordance with embodiments supporting Figure 69;



5 Figure 71 depicts a flowchart of further details regarding operation 2642, generating a client service query message using the service profiler process performed by the service profiler in accordance with embodiments;

Figure 72 depicts a flowchart of operations using the third message interface on the service extender computer in accordance with embodiments supporting

10 Figure 57;

Figure 73 depicts a flowchart of further details regarding operation 2602, generating the service-provider-viewable client service query message in accordance with embodiments supporting Figures 55;

15 Figure 74 depicts a flowchart of further details regarding operation 2708, generating the client response message using the second message interface in accordance with embodiments supporting Figure 56;

Figure 75 depicts a flowchart of further operations embodying the third message interface in accordance with certain embodiments;

20 Figure 76 depicts a flowchart of further operations embodied in the message profiler process in accordance with certain embodiments;

Figure 77 depicts a flowchart of further operations embodied in a second message interface in accordance with certain embodiments supporting service recommendations;

25 Figure 78 depicts a flowchart of further operations embodied in a service profiler in accordance with certain embodiments supporting service recommendations;

Figure 78A depicts a flowchart of further details regarding operation 3311, integrating a service order in the service profiler process in accordance with embodiments supporting Figure 78;

- 5     Figure **79** depicts a flowchart of further operations embodied in the first message interface in accordance with certain embodiments supporting service recommendations;

Figure **80** depicts a flowchart of further details of operation **3352**, ordering the embedded service recommendation of Figure 79;

- 10    Figure **81** depicts a flowchart of further details of operation **3170** of Figure **73**;

Figure **82** depicts a flowchart of further details of operation **3222** of Figure **75**;

Figure **83** depicts a flowchart of further details of operation **3402** of Figure **82**;

- 15    Figure **84** depicts a flowchart of further operations embodying the message profiler process in accordance with certain embodiments supporting billing clients;

Figure **85** depicts a flowchart of further operations embodying the message profiler process in accordance with certain embodiments further supporting billing clients;

- 20    Figure **86** depicts a flowchart of further operations embodying a billing process in accordance with certain embodiments;

Figure **87** depicts a flowchart of further details of operation **3518** of Figure **86**;

Figure **88** depicts a flowchart of further details of operation **2704** of Figure **56** supporting a service provider requesting a second opinion in accordance with certain embodiments;

- 25    Figure **89** depicts a flowchart of operations embodied in the second message interface supporting a second service provider and a second opinion request in accordance with certain embodiments;

5 Figure **90** depicts a flowchart of operations embodied in a second message interface supporting maintaining a collection of client response templates in accordance with certain embodiments;

Figure **91** depicts a flowchart of further details of operation **2704** of Figure **56** supporting use of a client response template to create a first-service-provider  
10 response in accordance with certain embodiments;

Figure **92** depicts a flowchart of operations embodied in a first message interface to support maintaining a collection of client problem templates in accordance with certain embodiments;

Figure **93** depicts a flowchart of further details of operation **2604** of Figure **53** supporting use of a client problem template to create an educated service query  
15 using a first service interface in accordance with certain embodiments;

Figure **94** depicts a flowchart of operations embodied in a service profiler process to generate and send client problem templates to clients in accordance with certain embodiments;

20 Figure **95** depicts a flow diagram of a service profiler process in accordance with certain embodiments;

Figure **96** depicts a flow diagram of a computer program capable of receiving a message from a service provider containing a service recommendation and responding to the message containing the service recommendation by  
25 generating and sending a service order message in accordance with certain embodiments in accordance with an aspect of the invention;

Figure **97** depicts a flowchart of further details of the code of **3854** of Figure **96** supporting receiving a client response message with an embedded service recommendation in accordance with certain embodiments; and

- 5     Figure **98** depicts a flowchart of further details of the code of **3862** of Figure **96** supporting responding to the client response message in accordance with certain embodiments.

Figure **98A** depicts a flowchart of further details of **3311** of Figure **78** supporting integrating a service order in accordance with certain embodiments;

- 10    Figure **98B** depicts a flowchart of further details of **3324** of Figure **78A** supporting generating a supplier service order in accordance with certain embodiments;

Figure **98C** depicts a flowchart of further details of **3326** of Figure **78A** supporting sending a supplier service order to a supplier in accordance with certain embodiments;

- 15    Figure **98D** depicts a flowchart of further details of **3106** of Figure **71** supporting determining a routing chain of service extenders and embedding the routing chain into a second client query in accordance with certain embodiments;

- Figure **98E** depicts a flowchart of further details of **3178** of Figure **72** supporting determining successor service extenders in an embedded service extender routing chain, generating a successor medical query message with embedded proposed client response and sending the successor client medical query to the successor service extender;
- 20

- Figure **98F** depicts a flowchart of further details of **2646** of Figure **53** supporting generating a routing tree of service providers with first service provider final destination and source list of service providers, generating and sending a source medical query to each service provider included in the service provider source list;
- 25

## **Detailed Description of the Invention**

Figure 1 and 2 refer to prior art and were previously discussed in the Background of the invention.

Discussion of Primary Terms as used herein:

A message will refer to a communication session with a source and a destination whose contents can be described in a digital fashion. Examples of messages include but are not limited to phone mail, email and pager messages.

A medical profile of a patient is a collection of information residing in some computer accessible media which from time to time a computer may be able to access.

The medical profiler process is the system-wide activities which are performed in an automated fashion by the workflow engine to facilitate the medical communication between patients, physicians, physician extenders and pharmacies to support at least the following: medical queries, replies and transactions involved in prescriptions.

The workflow engine is the mechanism performing the collection of operations known as the medical profiler process. It has at least one address on the network shared with patients, physicians, physician extenders and pharmacies. Note that this shared network may in fact be partitioned into a collection of networks, each possessing gateways, firewalls and the like as is well known in the art. Note that the workflow engine may include but is not limited to one computer, and in fact, in certain embodiments preferably involves more than one server computer as will be discussed later.

A patient as used herein will have two components of meaning: the first component being the entity about whose health the medical profile, query

5 messages, response message and prescriptions are directed; the second is the responsible adult acting for the patient in all the transactions, such as generating the query messages, receiving and considering the response messages and ordering the prescriptions. Note that a list of the first component entities includes but is not limited to pets, trees, children, the physically incapacitated, the  
10 mentally incapacitated and the emotionally incapacitated.

Figure 3A depicts a flow diagram of an embodiment of the invention in accordance with certain embodiments. There are two main flows of information likely to be prevalent with users of this invention. The most common flow would be a patient 200 initiate 202 query 204, where the patient will launch an  
15 electronic message 206. These messages can subcategorized in four main groups- Request a refill, Schedule an appointment, Consult symptoms with the physician 212 and page the physician 212. The second possible flow is initiation of messages by the clinic/physician 212 aimed at broadcasting information to patients 200.

20 At the time of registration or post sending the first consultation/refill request the patient 200 is being asked to fill in his/her medical profile 208. Medical profile 208 would contain the patient 200's medication list, allergies, problems and demographics. The medical profile 208 is then validated by the patient 200's medical staff and is approved. Once approved the medical profile 208 is locked  
25 and the patient 200 may not alter the profile. The profile 208 is updated automatically by transactions made by the workflow engine or by the patient's medical staff. In the event that the patient 200 wants to edit the medical profile 208 then the patient initiates a query 204 to the medical staff informing them that the profile needs corrections. The medical staff can with one click approve the  
30 patient query 204 and update the profile 208.

Figure 3A portrays the typical flow of a patient 200 initiated query 204. The patient 200 through the use of a wizard 202, initiates an educated query 204.

5 Using a problem-related database and knowledge of the patient medical profile  
**208**, the application generates a problem specific questioner (form). This form is  
both problem and patient **200** specific. The form is advantageous in that it  
removes the need for a great deal of typing on behalf of the patient **200**. It is  
further advantageous in decreasing the need for message ping pong between  
10 the patient **200** and the physician **212** due to insufficient data. It is further  
advantageous in allowing the physician **212** to read a more readable and  
intelligent format than that of a patient **200** free text waffle.

The next step in the flow of the message is attaching the summary of the patient  
medical record or as we call it 'medical profile' **208** to the message. The patient  
15 **200** initiates the medical profile at the point of registration to the workflow engine  
or at the time of the first refill/consult request. The patient **200** is asked by the  
workflow engine to fill in his/her medical profile i.e. problems allergies and  
medications. This medical profile **208** is interactive and will be later validated by  
the nurse **242** or physician **212**. Once validated for the first time it is locked and  
20 the patient **200** can no longer tamper with the data. Any prescription **252** sent  
through the workflow engine automatically updates the medical profile **208**. The  
patient **200** may add data to the 'locked' medical profile **208** but that data will not  
be embedded in the medical profile **208** prior to the physician **212** or his staff  
validating the new data. The workflow engine attaches the medical profile **208** to  
25 any patient related document thus avoids the need for a chart pull at the point of  
care, plus it allows the patient **200** to present the medical profile **208** to foreign  
physicians **212** when on the move.

The workflow engine then takes the message and the medical profile **208**  
attached and routes it to the proper physician extender according to the type of  
30 message sent. As an example, a refill messages would be routed to the nurse  
**242**, an urgent scheduling query will also get to the nurse **242**, a non-urgent  
query will be routed to the scheduling desk. This process allows the physician  
**212** to share the workload with his extenders.

5 Each member of the physician's staff can create his own canned replies **246**.  
These are replies that were typed once by the staff were saved and may be  
pasted with two clicks to message bodies of future replies. With many physicians  
complaining about repetitious replies to their patients this tool allows both the  
saving of time and a reduction in typing need. The pasted 'canned replies' are  
10 then editable and customizable.

Once edited and filled by the medical staff the messages are routed to the  
physician **212** who in most cases needs to do nothing more then approve his  
staff's work and in a single click send the message to the patient **200**. The  
physician **212** at this stage may determine a fee for the service and add  
15 educational material **220** and pointers (from a library) to sites of further patient  
education. The workflow engine notifies the patient **200** via regular e-mail  
([patient@aol.com](mailto:patient@aol.com)) that a message is waiting for him in his Healinx inbox and  
provides an hyperlink to lead the patient **200** to his Healinx inbox.

The physician/physician extender may also prescribe medication and attach it to  
20 the outgoing message, this in turn checks the medication using a licensed  
database against the patient's medical profile for drug/drug, drug/allergy conflicts  
and alerts the physician. It also allows us to attach education material to the  
prescription alerting the patient **200** for possible side effects and actions that  
should or should not be taken with the prescribed medication. Education material  
25 **220** taken from the database is attached to the prescription and can be viewed  
by the patient **200**.

The patient **200** reading the message views the embedded prescription and has  
the choice of ordering **264** the prescription in the pharmacy of his choice to be  
delivered from an online pharmacy **260** or to be picked up from his favorite brick  
30 and mortar traditional pharmacy **260**. In addition in the event that the patient **200**  
is on the move then he may choose with a single click the closest pharmacy **260**



5 and the prescription will be electronically shipped to that pharmacy **260** at no extra cost or hassle.

Physicians **212** may set the workflow engine to allow patient **200** paging, the message **204** typed by the patient **200** will be sent to the physician **212** over pager or phone. The physician **212** can then request **214** additional information  
10 such as the patient medical profile and initiate a call back **216** to the patient **200**. The physician **212** may set up the times of day he willing to be accessible by pager and the pricing per beep dependant on the time of day.

Further embodiments of the invention support the workflow engine creating routing chains of physician extenders starting with a first physician extender  
15 proceeding through successor physician extenders until the routing chain terminates with a physician reviewing the collective proposed patient response. The routing chain may be generated by the workflow engine based upon the patient's educated query message.

Further embodiments of the invention support the workflow engine creating  
20 routing trees of physicians with patent query messages starting with a source list of physicians, possibly routing to intermediate physicians and culminating in a first physician who reviews the collective physician responses to their respective patient medical queries.

Using outsourced solutions, the patients **200** can monitor their readings of blood  
25 pressure, sugar level, or other monitoring and transmit it to Healinx. We then take the readings and imbed these in the patient medical profile **208**. If abnormal readings are found both patient **200** and physician **212** are notified.

Through an embedded database and the patient's medical profile **208** the workflow engine searches for patient **200** as to who should schedule a preventive  
30 examination. As an example the workflow engine would remind all women 25-45 to schedule a mammogram. The workflow engine will hold a customized

5 preventive health calendar per patient **200** and remind that patient **200** to schedule an appointment if needed.

Through the medical profile **208** of patient **200**'s the workflow engine will allow clinics to search for certain patient characteristics. Using this filter the clinic can rapidly create variable patient mailing lists to which they can mail at once. For  
10 example in the event that the clinic seeks to contact all males aged 25-45 who are smokers that take Prozac.

Further embodiments of the invention include the capability for a vendor to author templates and routing them through an authoring tool. Templates would be descriptions of the most common customer queries. The templates would  
15 support the customer diagnostics of the problem and allow the customer to provide a comprehensive description of the problem encountered.

The customer can then be provided with the most common solutions to the diagnosis. And allow the client to choose whether the off-the-shelf reply is adequate or not. If not then the customer may send the query to the vendor. For  
20 premium pricing the customer may page and get an immediate phone response.

Identifying the template used allows triage of the mail into the most adequate department for reply. This allows the people in charge of replying to customize their replies and paste these in the message body. The message according to its severity can then be sent to a supervisor for approval or directly to the patient  
25 **200**.

The vendor may attach a prescription (the spare part needed) and allow the patient **200** to choose the most convenient service center. The order is then sent to a service center of the customer's **200** choice and authorization and pricing of the entire service are controlled by the vendor.

- 5 service tasks under the direction of physicians **212**. Arrow **234** depicts the sending of proposed patient response messages generated by physician extenders **232** to a physician **212**. Arrow **240** depicts another message information flow from the workflow engine to a nurse **242**. While nurses are physician extenders, a nurse **242** performs a specific additional task
- 10 distinguishing them from other physician extenders, such as physician assistants and administrators. Nurse **242** can propose prescription refills for example. Arrow **244** depicts the sending of proposed patient response message, which may further include proposed embedded prescription refills, from nurse **242** to physician **246**.
- 15 Physician **212** performs a review on the proposed patient response messages from physician extenders, including nurses, as delivered by arrows **234** and **244**. Template replies **246** offer the capability for physicians to optimize the quality and efficiency of response in making many standard replies. Arrow **248** depicts the interaction between template replies **246** and physician **212**.
- 20 Arrow **250** depicts the information and activity flow based upon the consultative response **216** and the placing of a prescription message **252**. Prescription message **252** is created based upon the physician's consultative response **216**, which in turn is based upon the patient's medical query message and possibly a nurse's proposed prescription refill. Arrow **254** depicts sending a prescription
- 25 message **252** to ordering process **256**. Patient **200** receives the patient response message **226**, and may respond by ordering the embedded prescription, which is depicted by arrow **264** indicating a patient prescription message sent to ordering process **256**. Ordering process **256** waits until both the physician prescription message **254** and patient prescription message **264** have been received and
- 30 processed before the order **258** is actually placed with pharmacy **260**. Pharmacy **260** sends the prescription to patient **300** as indicated by arrow **362**.

Figure 4 depicts an interactive flow between a patient using a first messaging wizard, workflow engine performing a medical profiler process and physician using a second messaging wizard in accordance with an embodiment of the invention. Patient 300 interacts 302 with patient operated computer 304, which can access 306 and perform the operations of first messaging wizard 308. Physician 350 interacts 352 with physician operated computer 354, which can access 356 and perform the operations of second messaging wizard 358. Physician extender 400 interacts 402 with physician extender operated computer 404, which can access 406 and perform the operations of second messaging wizard 408.

Patient 300 using first messaging wizard 308 on patient operated computer 304 generates 310 educated query message 312 and sends it 314 to workflow engine 320 where it is received by medical profiler process 322. Medical profiler process 322 generates 324 patient message log entry 326, which is added 328 to the patient medical profile 330. Medical profiler process 322 further generates 340 patient medical query message 342, which is sent 344 to physician operated computer 354.

Physician 350 using second messaging wizard 358 on physician operated computer 354 receives and responds to the patient medical query message 342, generating 360 a patient response message 362, which in certain embodiments is sent 364 directly to the patient operated computer 304. In certain alternative embodiments, patient response message 362 is sent 370 to the workflow engine, where the medical profiler process 322 then sends 372 a version to the patient operated computer 304. Physician 350 using second messaging wizard 358 on physician operated computer 354 further responds to the patient medical query message 342, generating a patient response message with appended physician billing data 382, which is sent 384 to to the workflow engine, where the medical profiler process 322 then generates 390 a patient response log entry 392 which is added 394 to the patient medical profile 330.

5 In certain situations, a prescription is embedded into patient response message  
362 by the physician 350 using second messaging wizard 358 on physician  
operated computer 354 in response to the patient medical query message 342,  
which embedded into the patient response message 362. Physician 350 using  
second messaging wizard 358 on physician operated computer 354 also  
10 generates 480 physician prescription message 482, which is sent 484 to the  
workflow engine using the medical profiler process 322. Patient 300 using first  
messaging wizard 308 on patient operated computer 304 generates 490 patient  
prescription order message 492 and sends it 494 to workflow engine 320 where it  
is received by medical profiler process 322. Once both physician prescription  
15 message 482 and patient prescription order message 492 have been received  
and authenticated, the medial profiler process 322 generates 500 a pharmacy  
prescription order message 502 which is sent 504 to the pharmacy computer  
506.

Medical profiler process 322 accesses 510 the patient medical profile 330 to  
20 generate 512 patient billing report message 514 which is sent 516 to billing  
system 518. Note that the billing system 518 in certain embodiments is a  
separate system element external to the workflow engine. In certain alternative  
embodiments, billing system 518 resides within the operations performed by the  
workflow engine. In certain further embodiments, billing system 518 is part of the  
25 medical profiler process.

Medical profiler process 322 further generates 400 a second patient medical  
query message 402, which is sent 404 to physician extender operated computer  
414. Physician extender 410 using third messaging wizard 418 on physician  
operated computer 414 receives and responds to the second patient medical  
30 query message 412, generating 430 a proposed patient response message 432,  
which is sent 434 directly to the physician operated computer 354, where it is  
inserted into the patient medical query message 342. In certain alternative  
embodiments, patient response message 432 is sent 436 to the workflow engine,

5 where the medical profiler process **322** then sends a version to the physician operated computer **354**. Physician extender **410** using third messaging wizard **418** on physician operated computer **414** further responds **440** to the second patient medical query message **402**, generating a proposed patient response message with appended physician extender billing data **442**, which is sent **444** to  
10 the workflow engine, where the medical profiler process **322** then generates **450** a proposed patient response with appended physician extender billing data log entry **452** which is added **454** to the patient medical profile **330**.

Note that in the flowcharts included herein, the starting operation of a flowchart may perform operations to allocate systems resources for use by the subsequent  
15 operations of the flowchart in certain embodiments. The starting operation of a flowchart may further perform initialize systems resources in certain embodiments.

Note also that in the flowcharts included herein, the terminating or exit operation of a flowchart may perform operations to release allocated systems resources  
20 used by the subsequent operations of the flowchart in certain embodiments. The terminating operation of a flowchart may further perform a "return" operation in certain embodiments. Alternatively, the terminating operation of a flowchart may not perform a "return" operation in certain embodiments.

Figure 5 depicts a flowchart of operations supporting the generation and sending  
25 of an educated query by a patient using the first messaging wizard in accordance with embodiments supporting Figure 4. Operation **600** starts the operations of this flowchart. Arrow **602** directs the flow of execution from operation **600** to operation **604**. Operation **604** performs generating of an educated query message. Arrow **606** directs execution from operation **604** to operation **608**.  
30 Operation **608** performs sending the educated query message to the workflow engine. Arrow **610** directs execution from operation **608** to operation **612**. Operation **612** terminates the operations of this flowchart.

Figure 6 depicts a flowchart of operations supporting the reception, processing, logging of the educated query message from the patient, and the generation and sending of the patient medical query message to a physician by the medical profiler process performed by the workflow engine in accordance with embodiments supporting Figure 4. Operation 630 starts the operations of this flowchart. Arrow 632 directs the flow of execution from operation 630 to operation 634. Operation 634 performs receiving the educated query message at the workflow engine. Arrow 636 directs execution from operation 634 to operation 638. Operation 638 performs processing the received educated query message to create the processed, received educated query message. Arrow 640 directs execution from operation 638 to operation 642. Operation 642 performs generating a patient medical query message. Arrow 644 directs execution from operation 642 to operation 646. Operation 646 performs sending the patient medical query message to first physician at corresponding physician address. Arrow 648 directs execution from operation 646 to operation 650. Operation 650 terminates the operations of this flowchart.

In certain embodiments, operation 646 further includes selecting a first physician. In certain further embodiments, operation 646 further includes selecting a first physician based upon the received educated query message. In certain further embodiments, operation 646 further includes selecting a first physician based upon the processed, received educated query message.

Arrow 652 directs the flow of execution from starting operation 638 to operation 654. Operation 654 performs generating a patient message log entry in the patient medical profile. Arrow 656 directs execution from operation 654 to operation 650.

Figure 7 depicts a flowchart of operations supporting reception, processing and viewing the patient medical query message by the second message wizard for the physician in accordance with embodiments supporting Figure 4. Operation

5 **670** starts the operations of this flowchart. Arrow **672** directs the flow of execution from operation **670** to operation **674**. Operation **674** performs receiving the patient query message. Arrow **676** directs execution from operation **674** to operation **678**. Operation **678** performs processing the received patient medical query message to create the processed, received patient medical  
10 message. Arrow **680** directs execution from operation **678** to operation **682**. Operation **682** performs generating a physician-viewable patient medical query message from the processed, received patient medical query message. Arrow **684** directs execution from operation **682** to operation **686**. Operation **686** performs displaying the physician-viewable patient medical query message.  
15 Arrow **688** directs execution from operation **686** to operation **690**. Operation **690** terminates the operations of this flowchart.

Figure 8 depicts a flowchart of operations supporting reception, generation and sending a patient response message, as well as copying the patient response message with an appended physician billing data to the workflow engine in  
20 accordance with embodiments supporting Figure 4. Operation **700** starts the operations of this flowchart. Arrow **702** directs the flow of execution from operation **700** to operation **704**. Operation **704** performs responding to the physician-viewable patient medical query message to create a first-physician response. Arrow **706** directs execution from operation **704** to operation **708**.  
25 Operation **708** performs generating a patient response message from the first-physician response. Arrow **710** directs execution from operation **708** to operation **712**. Operation **712** performs sending the patient response message to the patient at the corresponding patient address. Arrow **714** directs execution from operation **712** to operation **716**. Operation **716** terminates the operations of this  
30 flowchart.

Arrow **720** directs the flow of execution from starting operation **708** to operation **722**. Operation **722** performs copying the patient response message with



5 appended physician billing data to workflow engine. Arrow **724** directs execution from operation **722** to operation **716**.

Figure **9** depicts a flowchart of operations supporting the reception, processing, logging the copied patient response message with an appended physician billing data by the medical profiler process performed by the workflow engine in accordance with embodiments supporting Figure **4**. Operation **740** starts the operations of this flowchart. Arrow **742** directs the flow of execution from operation **740** to operation **744**. Operation **744** performs receiving the copied patient response message with appended physician billing data. Arrow **746** directs execution from operation **744** to operation **748**. Operation **748** performs processing the received, copied patient response message with appended physician billing data to create the processed, received, copied patient response message with appended physician billing data. Arrow **750** directs execution from operation **748** to operation **752**. Operation **752** performs generating a patient response log entry in patient medical profile from the processed, received, copied patient response message with appended physician billing data. Arrow **754** directs execution from operation **752** to operation **756**. Operation **756** terminates the operations of this flowchart.

Figure **10** depicts a flowchart of operations supporting reception, processing and display of the patient response message using the first messaging wizard on the patient operated computer in accordance with embodiments supporting Figure **4**. Operation **Q0** starts the operations of this flowchart. Arrow **772** directs the flow of execution from operation **770** to operation **774**. Operation **774** performs receiving the patient response message. Arrow **776** directs execution from operation **774** to operation **778**. Operation **778** performs processing the received patient response message, to create a processed, received patient response message. Arrow **780** directs execution from operation **778** to operation **782**. Operation **782** performs displaying the processed, received patient response

5 message. Arrow **784** directs execution from operation **782** to operation **786**. Operation **786** terminates the operations of this flowchart.

Figure **11** depicts a flowchart of further details regarding operation **604**, generation of an educated query message by the first messaging wizard in accordance with embodiments supporting Figure **5**. Arrow **800** directs the flow of execution from starting operation **604** to operation **802**. Operation **802** performs providing a patient-to-profiler authentication key. Arrow **804** directs execution from operation **802** to operation **806**. Operation **806** performs encrypting the educated query message with patient-to-profiler authentication key. Arrow **808** directs execution from operation **806** to operation **810**. Operation **810** terminates the operations of this flowchart.

Figure **12** depicts a flowchart of further details regarding operation **638**, processing the educated query message using the medical profiler process performed by the workflow engine in accordance with embodiments supporting Figure **6**. Arrow **820** directs the flow of execution from starting operation **638** to operation **822**. Operation **822** performs providing a profiler-from-patient authentication key. Arrow **824** directs execution from operation **822** to operation **826**. Operation **826** performs decrypting the received, educated query message with profiler-from-patient authentication key. Arrow **828** directs execution from operation **826** to operation **830**. Operation **830** terminates the operations of this flowchart.

Figure **13** depicts a flowchart of further details regarding operation **642**, generation of a patient medical query message by the medical profiler process performed by the workflow engine in accordance with embodiments supporting Figure **6**. Arrow **850** directs the flow of execution from starting operation **642** to operation **852**. Operation **852** performs providing profiler-from-first-physician authentication key. Arrow **854** directs execution from operation **852** to operation **856**. Operation **856** performs encrypting patient medical query message with

5 profiler-from-first-physician authentication key. Arrow **858** directs execution from operation **856** to operation **860**. Operation **860** terminates the operations of this flowchart.

Figure **14** depicts a flowchart of further details regarding operation **678**, processing the received patient medical query message by the second  
 10 messaging wizard in accordance with embodiments supporting Figure 7. Arrow **880** directs the flow of execution from starting operation **678** to operation **882**. Operation **882** performs providing a first-physician-from-profiler authentication key. Arrow **884** directs execution from operation **882** to operation **886**. Operation **886** performs decrypting the received patient medical query message  
 15 with the first-physician-from-profiler authentication key. Arrow **888** directs execution from operation **886** to operation **890**. Operation **890** terminates the operations of this flowchart.

Figure **15** depicts a flowchart of further details regarding operation **722**, copying the patient response message with appended physician billing data to the  
 20 workflow engine by the second messaging wizard in accordance with embodiments supporting Figure 8. Arrow **900** directs the flow of execution from starting operation **722** to operation **902**. Operation **902** performs providing a first-physician-to-profiler authentication key. Arrow **904** directs execution from operation **902** to operation **906**. Operation **906** performs encrypting the patient  
 25 response message with appended physician billing data with the first-physician-to-profiler authentication key. Arrow **908** directs execution from operation **906** to operation **910**. Operation **910** performs sending first-physician-to-profiler encrypted patient response message with appended physician billing data to the workflow engine. Arrow **912** directs execution from operation **910** to operation  
 30 **914**. Operation **914** terminates the operations of this flowchart.

Figure **16** depicts a flowchart of further details regarding operation **748**, processing the received, copied the patient response message with appended

physician billing data using the medical profiler process performed by the workflow engine in accordance with embodiments supporting Figure 9. Arrow 930 directs the flow of execution from starting operation 748 to operation 932. Operation 932 performs providing a profiler-from-first-physician authentication key. Arrow 934 directs execution from operation 932 to operation 936. Operation 936 performs decrypting the received, copied patient response message with appended physician billing data with the profiler-from-first physician authentication key to create the processed, received patient response message with appended physician billing data. Arrow 938 directs execution from operation 936 to operation 940. Operation 940 terminates the operations of this flowchart.

Figure 17 depicts a flowchart of further details regarding operation 708, generating patient response message using the second message wizard in accordance with embodiments supporting Figure 8. Arrow 950 directs the flow of execution from starting operation 708 to operation 952. Operation 952 performs providing first-physician-to-patient authentication key. Arrow 954 directs execution from operation 952 to operation 956. Operation 956 performs generating an unencrypted patient response message from the physician-viewable patient medical query message and the first-physician response. Arrow 958 directs execution from operation 956 to operation 960. Operation 960 performs encrypt the unencrypted patient response message with the first-physician-to-patient authentication key to create the patient response message. Arrow 962 directs execution from operation 960 to operation 964. Operation 964 terminates the operations of this flowchart.

Note that operations 952 and 956 may be performed either in the order presented by this flowchart, or in certain alternative embodiments, in the reverse order to that shown, or further alternatively, concurrently with each other.

Figure 18 depicts a flowchart of further details regarding operation 778, processing the received patient response message using the first message wizard in accordance with embodiments supporting Figure 10. Arrow 980 directs the flow of execution from starting operation 778 to operation 982. Operation 982 performs providing a patient-from-first-physician authentication key. Arrow 984 directs execution from operation 982 to operation 986. Operation 986 performs decrypting the received patient response message with the patient-from-first-physician authentication key to create the processed, received patient response message. Arrow 988 directs execution from operation 986 to operation 990. Operation 990 terminates the operations of this flowchart.

Figure 19 depicts a flowchart of further details regarding operation 712, sending the patient response message with appended physician billing data using the medical profiler process performed by the workflow engine in accordance with embodiments supporting Figure 8. Arrow 1000 directs the flow of execution from starting operation 712 to operation 1002. Operation 1002 performs sending patient response message destined to patient to workflow engine. Arrow 1004 directs execution from operation 1002 to operation 1006. Operation 1006 terminates the operations of this flowchart.

Figure 20 depicts a flowchart of further details regarding operation 708, generating the patient response message using the second message wizard in accordance with embodiments supporting Figure 8. Arrow 1010 directs the flow of execution from starting operation 708 to operation 1012. Operation 1012 performs providing the first-physician-to-profiler authentication code. Arrow 1014 directs execution from operation 1012 to operation 1016. Operation 1016 performs providing the patient address as destination address within the patient response message, to create an unencrypted patient response message with patient address destination. Arrow 1018 directs execution from operation 1016 to operation 1020. Operation 1020 performs encrypting the unencrypted patient response message with the first-physician-to-profiler authentication code to

5 create the patient response message destined for the patient at the corresponding patient address. Arrow **1022** directs execution from operation **1020** to operation **1024**. Operation **1024** terminates the operations of this flowchart.

Note that operations **1012** and **1016** in certain alternative embodiments may be performed in reverse order, and in certain further alternative embodiments, may be concurrently performed.

Figure **21** depicts a flowchart of operations of the medical profiler process performed by the workflow engine in accordance with alternative embodiments supporting Figure **4**. Operation **1040** starts the operations of this flowchart. Arrow **1042** directs the flow of execution from operation **1040** to operation **1044**. Operation **1044** performs receiving the patient response message destined for the patient at the corresponding patient address. Arrow **1046** directs execution from operation **1044** to operation **1048**. Operation **1048** performs processing the received patient response message destined for the patient at the corresponding patient address, to create the patient response message for the patient at the corresponding patient address. Arrow **1050** directs execution from operation **1048** to operation **1052**. Operation **1052** performs sending the patient response message to the patient at the corresponding patient address. Arrow **1054** directs execution from operation **1052** to operation **1056**. Operation **1056** terminates the operations of this flowchart.

Figure **22** depicts a flowchart of further details regarding operation **1048**, processing the patient response message destined for the patient using the medical profiler process performed by the workflow engine in accordance with embodiments supporting Figure **21**. Arrow **1070** directs the flow of execution from starting operation **1048** to operation **1072**. Operation **1072** performs providing a profiler-from-first-physician authentication key. Arrow **1074** directs execution from operation **1072** to operation **1076**. Operation **1076** performs

5 decrypting the received patient response message destined for the patient at the corresponding patient address to create the processed, received patient response message for the patient at the corresponding patient address. Arrow **1078** directs execution from operation **1076** to operation **1080**. Operation **1080** terminates the operations of this flowchart.

10 Figure **23** depicts a flowchart of further details regarding operation **642**, generating a patient medical query message using the medical profiler process performed by the workflow engine in accordance with embodiments. Arrow **1100** directs the flow of execution from starting operation **642** to operation **1102**. Operation **1102** performs selecting a first physician extender from the physician extenders. Arrow **1104** directs execution from operation **1102** to operation **1106**. Operation **1106** performs generating a second patient medical query message for the first physician extender. Arrow **1108** directs execution from operation **1106** to operation **1110**. Operation **1110** performs sending the second patient medical query message to the first physician extender at the corresponding physician extender address. Arrow **1112** directs execution from operation **1110** to operation **1114**. Operation **1114** terminates the operations of this flowchart.

Note that in certain embodiments, operation **1102** is based upon the received educated query message. In certain further embodiments, operation **1102** is based upon the processed, received educated query message.

25 Figure **24** depicts a flowchart of operations using the third message wizard on the physician extender computer in accordance with embodiments supporting Figure **9**. Operation **1150** starts the operations of this flowchart. Arrow **1152** directs the flow of execution from operation **1150** to operation **1154**. Operation **1154** performs receiving a second patient message by first physician extender operating a computer at the corresponding physician extender address. Arrow **1156** directs execution from operation **1154** to operation **1158**. Operation **1158** performs processing the received second patient medical query message to

5 create a processed, received second patient medical query message. Arrow **1160** directs execution from operation **1158** to operation **1162**. Operation **1162** performs generating a physician extender-viewable patient medical query message from the processed, received second patient medical query message. Arrow **1164** directs execution from operation **1162** to operation **1166**. Operation  
 10 **1166** performs displaying the physician extender-viewable medical query message. Arrow **1168** directs execution from operation **1166** to operation **1170**. Operation **1170** performs responding to the physician extender-viewable medical query message to create a physician extender response. Arrow **1172** directs execution from operation **1170** to operation **1174**. Operation **1174** performs  
 15 generating the proposed patient response message from physician extender response. Arrow **1176** directs execution from operation **1174** to operation **1178**. Operation **1178** performs sending the proposed patient response message to the first physician at the corresponding physician address. Arrow **1180** directs execution from operation **1178** to operation **1182**. Operation **1182** terminates the  
 20 operations of this flowchart.

Figure **25** depicts a flowchart of further details regarding operation **682**, generating the physician-viewable patient medical query message in accordance with embodiments supporting Figures **7**. Arrow **1200** directs the flow of execution from starting operation **682** to operation **1202**. Operation **1202** performs  
 25 receiving proposed patient response message from first physician extender. Arrow **1204** directs execution from operation **1202** to operation **1206**. Operation **1206** performs processing the received patient response message to create processed, received patient response message. Arrow **1208** directs execution from operation **1206** to operation **1210**. Operation **1210** performs inserting the  
 30 processed, received proposed patient response message as part of the physician-viewable patient medical query message. Arrow **1212** directs execution from operation **1210** to operation **1214**. Operation **1214** terminates the operations of this flowchart.



5 Figure 26 depicts a flowchart of further details regarding operation 708, generating the patient response message using the second message wizard in accordance with certain embodiments. Arrow 1220 directs the flow of execution from starting operation 708 to operation 1222. Operation 1222 performs reviewing the proposed patient response message. Arrow 1224 directs  
10 execution from operation 1222 to operation 1226. Operation 1226 terminates the operations of this flowchart.

Figure 27 depicts a flowchart of further operations embodying the third message wizard in accordance with certain embodiments. Arrow 1240 directs the flow of execution from starting operation 1240 to operation 1242. Operation 1242  
15 performs generating a copied proposed patient response message with appended physician extender billing data from the physician extender-viewable patient medical query message and first physician extender response. Arrow 1244 directs execution from operation 1242 to operation 1246. Operation 1246 performs sending copied proposed patient response with appended physician  
20 extender billing data to workflow engine. Arrow 1248 directs execution from operation 1246 to operation 1250. Operation 1250 terminates the operations of this flowchart.

Figure 28 depicts a flowchart of further operations embodied in the message profiler process in accordance with certain embodiments. Operation 1270 starts  
25 the operations of this flowchart. Arrow 1272 directs the flow of execution from operation 1270 to operation 1274. Operation 1274 performs receiving the copied proposed patient response message with the appended physician extender billing data. Arrow 1276 directs execution from operation 1274 to operation 1278. Operation 1278 performs processing the received copied proposed patient response message with the appended physician extender billing data, to create a  
30 processed, received copied proposed patient response message with the appended physician extender billing data. Arrow 1280 directs execution from operation 1278 to operation 1282. Operation 1282 performs generating a

physician extender log entry in the medical profile of the patient from the processed, received copied patient response message with the appended physician extender billing data. Arrow 1284 directs execution from operation 1282 to operation 1286. Operation 1286 terminates the operations of this flowchart.

Figure 29 depicts a flowchart of further operations embodied in a second messaging wizard in accordance with certain embodiments supporting prescriptions. Operation 1290 starts the operations of this flowchart. Arrow 1291 directs the flow of execution from operation 1290 to operation 1292. Operation 1292 performs generating an embedded prescription. Arrow 1293 directs execution from operation 1292 to operation 1294. Operation 1294 performs inserting the embedded prescription into patient response message. Arrow 1295 directs execution from operation 1294 to operation 1296. Operation 1296 performs generating a physician prescription message from the embedded prescription. Arrow 1297 directs execution from operation 1296 to operation 1298. Operation 1298 performs sending the physician prescription message to the workflow engine. Arrow 1299 directs execution from operation 1298 to operation 1300. Operation 1300 terminates the operations of this flowchart.

Figure 30 depicts a flowchart of further operations embodied in a medical profiler in accordance with certain embodiments supporting prescriptions. Operation 1305 starts the operations of this flowchart. Arrow 1306 directs the flow of execution from operation 1305 to operation 1307. Operation 1307 performs maintaining a list of pharmacies, each with a corresponding pharmacy address. Arrow 1308 directs execution from operation 1307 to operation 1309. Operation 1309 terminates the operations of this flowchart.

Arrow 1310 directs the flow of execution from starting operation 1305 to operation 1311. Operation 1311 performs integrating a prescription order. Arrow

5    **1312** directs execution from operation **1311** to operation **1309**. Operation **1309** terminates the operations of this flowchart.

Note that arrows **1306** and **1310** may be concurrently active, the pharmacy list may be undergoing maintenance operations and the integration of prescription orders may be performed concurrently on either the same computer or distinct  
10    computers according to various embodiments of the invention.

Figure **30A** depicts a flowchart of further details regarding operation **1311**, integrating a prescription order in the medical profiler process in accordance with embodiments supporting Figure **30**. Arrow **1315** directs the flow of execution from the starting of operation **1311** to operation **1316**. Operation **1316** performs  
15    receiving the physician prescription message. Arrow **1317** directs execution from operation **1316** to operation **1318**. Operation **1318** performs processing the received physician prescription message, to create a processed, received physician prescription message.

Arrow **1319** directs execution from operation **1311** to operation **1320**. Operation  
20    **1320** performs receiving a patient prescription order message. Arrow **1321** directs execution from operation **1320** to operation **1322**. Operation **1322** performs processing the received patient prescription order message to create a processed, received patient prescription order message.

Arrow **1323** directs execution from operation **1322** to operation **1324**. Arrow **1330**  
25    directs execution from operation **1318** to operation **1324**. Note that in certain embodiments, both arrows **1323** and **1330** must perform their flow of execution before operation **1324** can execute. Operation **1324** performs generating a pharmacy prescription order message from the processed, received physician prescription message and the processed, received patient prescription order  
30    message. Arrow **1325** directs execution from operation **1324** to operation **1326**. Operation **1326** performs sending the pharmacy prescription order message to one of the pharmacies at the corresponding pharmacy address. Arrow **1327**

5 directs execution from operation **1326** to operation **1328**. Operation **1328** terminates the operations of this flowchart.

Figure **31** depicts a flowchart of further operations embodied in the first messaging wizard in accordance with certain embodiments supporting prescriptions. Operation **1340** starts the operations of this flowchart. Arrow **1342**  
 10 directs the flow of execution from operation **1340** to operation **1344**. Operation **1344** performs responding to the embedded prescription within the processed, received patient response message. Arrow **1346** directs execution from operation **1344** to operation **1348**. Operation **1348** terminates the operations of this flowchart.

15 Arrow **1350** directs the flow of execution from starting operation **1340** to operation **1352**. Operation **1352** performs ordering the embedded prescription from the processed, received patient response message. Arrow **1354** directs execution from operation **1352** to operation **1348**. Operation **1348** terminates the operations of this flowchart.

20 Note that in certain embodiments, the starting operation may act as a branching mechanism. Such a mechanism can be driven by patient choices via a user interface, such as buttons or pull down menus being selected or pushed.

Figure **32** depicts a flowchart of further details of operation **1352**, ordering the embedded prescription of Figure **31**. Arrow **1360** directs the flow of execution  
 25 from starting operation **1352** to operation **1362**. Operation **1362** performs generating a patient prescription message from the processed, received patient response message. Arrow **1364** directs execution from operation **1362** to operation **1366**. Operation **1366** performs sending the patient prescription message to the workflow engine. Arrow **1368** directs execution from operation  
 30 **1366** to operation **1370**. Operation **1370** terminates the operations of this flowchart.

5 Figure 33 depicts a flowchart of further details of operation 1170 of Figure 25. Arrow 1380 directs the flow of execution from starting operation 1170 to operation 1382. Operation 1382 performs generating a proposed embedded prescription refill in the proposed patient response. Arrow 1384 directs execution from operation 1382 to operation 1386. Operation 1386 terminates the  
10 operations of this flowchart.

Figure 34 depicts a flowchart of further details of operation 1222 of Figure 27. Arrow 1400 directs the flow of execution from starting operation 1222 to operation 1402. Operation 1402 performs reviewing the proposed embedded prescription refill. Arrow 1404 directs execution from operation 1402 to operation  
15 1406. Operation 1406 terminates the operations of this flowchart.

Figure 35 depicts a flowchart of further details of operation 1402 of Figure 34. Arrow 1420 directs the flow of execution from starting operation 1402 to operation 1422. Operation 1422 performs approving the proposed prescription refill. Arrow 1424 directs execution from operation 1422 to operation 1426.  
20 Operation 1426 terminates the operations of this flowchart.

Arrow 1430 directs the flow of execution from starting operation 1402 to operation 1432. Operation 1432 performs revising the proposed embedded prescription refill. Arrow 1434 directs execution from operation 1432 to operation 1426. Operation 1426 terminates the operations of this flowchart.

25 Arrow 1440 directs the flow of execution from starting operation 1402 to operation 1442. Operation 1442 performs deleting the proposed embedded prescription refill. Arrow 1444 directs execution from operation 1442 to operation 1426. Operation 1426 terminates the operations of this flowchart.

Arrow 1450 directs the flow of execution from starting operation 1402 to  
30 operation 1452. Operation 1452 performs generating a second embedded

5 prescription. Arrow **1454** directs execution from operation **1452** to operation **1426**. Operation **1426** terminates the operations of this flowchart.

Note that in certain embodiments, the starting operation may act as a branching mechanism. Such a mechanism can be driven by patient choices via a user interface, such as buttons or pull down menus being selected or pushed.

10 Figure **36** depicts a flowchart of further operations embodying the message profiler process in accordance with certain embodiments supporting billing patients. Operation **1470** starts the operations of this flowchart. Arrow **1472** directs the flow of execution from operation **1470** to operation **1474**. Operation **1474** performs generating a billing report from the patient medical profile. Arrow **1476** directs execution from operation **1474** to operation **1478**. Operation **1478** terminates the operations of this flowchart.

Figure **37** depicts a flowchart of further operations embodying the message profiler process in accordance with certain embodiments further supporting billing patients. Operation **1490** starts the operations of this flowchart. Arrow **1492** directs the flow of execution from operation **1490** to operation **1494**. Operation **1494** performs sending the billing report to the billing system. Arrow **1496** directs execution from operation **1494** to operation **1498**. Operation **1498** terminates the operations of this flowchart.

Figure **38** depicts a flowchart of further operations embodying a billing process in accordance with certain embodiments. Operation **1510** starts the operations of this flowchart. Arrow **1512** directs the flow of execution from operation **1510** to operation **1514**. Operation **1514** performs receiving the billing report for the patient. Arrow **1516** directs execution from operation **1514** to operation **1518**. Operation **1518** performs generating a bill for the patient based from the received billing report for the patient. Arrow **1520** directs execution from operation **1518** to operation **1522**. Operation **1522** terminates the operations of this flowchart. ###

Figure 39 depicts a flowchart of further details of operation 1518 of Figure 38. Arrow 1540 directs the flow of execution from starting operation 1518 to operation 1542. Operation 1542 performs generating a personal bill for the patient. Arrow 1544 directs execution from operation 1542 to operation 1546. Operation 1546 terminates the operations of this flowchart.

Arrow 1550 directs the flow of execution from starting operation 1518 to operation 1552. Operation 1552 performs generating an insurance bill for the patient to corresponding insurance provider. Arrow 1554 directs execution from operation 1552 to operation 1546. Operation 1546 terminates the operations of this flowchart.

Note that a patient may not have insurance, so that in such circumstances, no insurance bills would be generated. Note also, that in certain circumstances, there may be an overall insuring, such as a governmental agency, fully paying for the health costs. In such circumstances, no personal medical bill might be generated. In certain alternative embodiments, the performing of these operations might not lead to output of one or the other kinds of medical bills.

Figure 40 depicts a flowchart of further details of operation 708 of Figure 8 supporting a physician requesting a second opinion in accordance with certain embodiments. Arrow 1570 directs the flow of execution from starting operation 704 to operation 1572. Operation 1572 performs generating a first-physician-second opinion request message. Arrow 1574 directs execution from operation 1572 to operation 1576. Operation 1576 performs sending the first-physician-second opinion request message to the second physician at the corresponding physician address. Arrow 1578 directs execution from operation 1576 to operation 1580. Operation 1580 terminates the operations of this flowchart.

Figure 41 depicts a flowchart of operations embodied in the second message wizard supporting a second physician and a second opinion request in accordance with certain embodiments. Operation 1600 starts the operations of

5 this flowchart. Arrow **1602** directs the flow of execution from operation **1600** to operation **1604**. Operation **1604** performs receiving the first-physician-second opinion request message. Arrow **1606** directs execution from operation **1604** to operation **1608**. Operation **1608** performs processing the received, first-physician-second opinion request message to create the processed, received  
10 first-physician-second opinion request. Arrow **1610** directs execution from operation **1608** to operation **1612**. Operation **1612** performs displaying the processed, received first-physician-second-opinion request. Arrow **1614** directs execution from operation **1612** to operation **1616**. Operation **1616** performs responding to the displayed, processed, received first-physician-second opinion  
15 request to create a second opinion response. Arrow **1618** directs execution from operation **1616** to operation **1620**. Operation **1620** performs generating a second opinion message from the second opinion response. Arrow **1622** directs execution from operation **1620** to operation **1624**. Operation **1624** performs sending the second opinion message to the first-physician at the corresponding  
20 physician address. Arrow **1626** directs execution from operation **1624** to operation **1628**. Operation **1628** terminates the operations of this flowchart.

Figure **42** depicts a flowchart of operations embodied in a second message wizard supporting maintaining a collection of patient response templates in accordance with certain embodiments. Operation **1640** starts the operations of  
25 this flowchart. Arrow **1642** directs the flow of execution from operation **1640** to operation **1644**. Operation **1644** performs creating a patient response template. Arrow **1646** directs execution from operation **1644** to operation **1648**. Operation **1648** terminates the operations of this flowchart.

Arrow **1650** directs the flow of execution from starting operation **1640** to  
30 operation **1652**. Operation **1652** performs editing one of the patient response templates. Arrow **1654** directs execution from operation **1652** to operation **1648**. Operation **1648** terminates the operations of this flowchart.



5 Arrow **1660** directs the flow of execution from starting operation **1640** to operation **1662**. Operation **1662** performs deleting one of the patient response templates. Arrow **1664** directs execution from operation **1662** to operation **1648**. Operation **1648** terminates the operations of this flowchart.

Note that in certain embodiments, the starting operation may act as a branching  
10 mechanism. Such a mechanism can be driven by patient choices via a user interface, such as buttons or pull down menus being selected or pushed.

Figure **43** depicts a flowchart of further details of operation **704** of Figure **8** supporting use of a patient response template to create a first-physician response in accordance with certain embodiments. Arrow **1670** directs the flow of  
15 execution from starting operation **704** to operation **1672**. Operation **1672** performs invoking one of the patient response templates in conjunction with the processed, received patient medical query message. Arrow **1674** directs execution from operation **1672** to operation **1676**. Operation **1676** performs responding by first physician to invoked patient response template and  
20 processed, received patient medical query message to create the first-physician response. Arrow **1678** directs execution from operation **1676** to operation **1680**. Operation **1680** terminates the operations of this flowchart.

Figure **44** depicts a flowchart of operations embodied in a first messaging wizard to support maintaining a collection of patient problem templates in accordance  
25 with certain embodiments. Operation **1700** starts the operations of this flowchart. Arrow **1702** directs the flow of execution from operation **1700** to operation **1704**. Operation **1704** performs receiving the patient problem template from workflow engine. Arrow **1706** directs execution from operation **1704** to operation **1708**. Operation **1708** performs processing the received patient problem template to  
30 create a processed, received patient problem template. Arrow **1710** directs execution from operation **1708** to operation **1712**. Operation **1712** performs adding the processed, received patient problem template to the collection of

5 patient problem templates. Arrow **1714** directs execution from operation **1712** to operation **1716**. Operation **1716** terminates the operations of this flowchart.

Figure **45** depicts a flowchart of further details of operation **604** of Figure 5 supporting use of a patient problem template to create an educated medical query using a first medical wizard in accordance with certain embodiments.

10 Arrow **1730** directs the flow of execution from starting operation **604** to operation **1732**. Operation **1732** performs invoking one of the patient problem templates. Arrow **1734** directs execution from operation **1732** to operation **1736**. Operation **1736** performs responding by patient to invoked patient problem templates to create the educated query message. Arrow **1738** directs execution from  
15 operation **1736** to operation **1740**. Operation **1740** terminates the operations of this flowchart.

Figure **46** depicts a flowchart of operations embodied in a medical profiler process performed by a workflow engine to generate and send patient problem templates to patients in accordance with certain embodiments. Operation **1760**  
20 starts the operations of this flowchart. Arrow **1762** directs the flow of execution from operation **1760** to operation **1764**. Operation **1764** performs generating a patient problem template from the patient medical profile. Arrow **1766** directs execution from operation **1764** to operation **1768**. Operation **1768** performs sending the patient problem template to the patient at the corresponding patient  
25 address. Arrow **1770** directs execution from operation **1768** to operation **1772**. Operation **1772** terminates the operations of this flowchart.

Figure **47** depicts a flow diagram of a medical profiler process in accordance with certain embodiments. Box **1800** designates a Medical Profiler Process Dispatcher. This communicates via physical transport mechanism **1802** to  
30 network **1804**. Box **1808** designates Medical profiler sub-process 1 on workflow engine 1, performing the operation **630** of Figure 6. This communicates via physical transport mechanism **1806** to network **1804**. Box **1812** designates

Medical profiler sub-process 2 on workflow engine 2, performing the operation 740 of Figure 9. This communicates via physical transport mechanism 1810 to network 1804. Box 1816 designates Medical profiler sub-process 3 on workflow engine 3, performing the operation 1040 of Figure 21. This communicates via physical transport mechanism 1814 to network 1804. Box 1820 designates Medical profiler sub-process 4 on workflow engine 4, performing the operation 1270 of Figure 28. This communicates via physical transport mechanism 1818 to network 1804. Box 1824 designates Medical profiler sub-process 5 on workflow engine 5, performing the operation 1470 of Figure 36. This communicates via physical transport mechanism 1822 to network 1804. Box 1828 designates Medical profiler sub-process 6 on workflow engine 6, performing the operation 1490 of Figure 37. This communicates via physical transport mechanism 1826 to network 1804. Box 1832 designates Medical profiler sub-process 7 on workflow engine 7, performing the operation 1760 of Figure 46. This communicates via physical transport mechanism 1830 to network 1804.

Note that in certain alternative embodiments, collections of these sub-processes may preferably reside on a single workflow engine. Note that in certain other embodiments, multiple workflow engines may be performing a given sub-process.

Figure 48 depicts a flow diagram of a computer program capable of receiving a message from a physician containing a prescription and responding to the message containing the prescription in accordance with an aspect of the invention. Operation 1850 starts the operations of this flowchart. Arrow 1852 directs the flow of execution from operation 1850 to operation 1854. Operation 1854 performs receiving the patient message with an embedded prescription. Arrow 1856 directs execution from operation 1854 to operation 1858. Operation 1858 performs displaying the received patient message with embedded prescription. Arrow 1860 directs execution from operation 1858 to operation 1862. Operation 1862 performs responding to the patient message with

5 embedded prescription. Arrow **1864** directs execution from operation **1862** to operation **1866**. Operation **1866** terminates the operations of this flowchart.

Figure **49** depicts a flowchart of further details of the code of **1854** of Figure **48** supporting receiving a patient message with an embedded prescription in accordance with certain embodiments. Arrow **1880** directs the flow of execution  
 10 from starting operation **1854** to operation **1882**. Operation **1882** performs receiving an encrypted patient message with embedded prescription. Arrow **1884** directs execution from operation **1882** to operation **1886**. Operation **1886** performs processing the received, encrypted patient message with embedded prescription to create the received patient message with embedded prescription.  
 15 Arrow **1888** directs execution from operation **1886** to operation **1890**. Operation **1890** terminates the operations of this flowchart.

Figure **50** depicts a flowchart of further details of the code of **1862** of Figure **48** supporting responding to the patient response message in accordance with certain embodiments. Arrow **1900** directs the flow of execution from starting  
 20 operation **1862** to operation **1902**. Operation **1902** performs generating a patient prescription message from said embedded prescription. Arrow **1904** directs execution from operation **1902** to operation **1906**. Operation **1906** performs sending said patient prescription message to said workflow engine. Arrow **1908** directs execution from operation **1906** to operation **1910**. Operation **1910**  
 25 terminates the operations of this flowchart.

Figure **50A** depicts a flowchart of further details of **1311** of Figure **30** supporting integrating a prescription order in accordance with certain embodiments.

Arrow **1920** directs the flow of execution from starting operation **1311** to operation **1922**. Operation **1922** determines if the received patient response  
 30 message contains an embedded prescription. Arrow **1924** directs execution from operation **1922** to operation **1926**. Arrow **1924** directs execution when the

- 5 determination is ☐Yes☐ to operation **1926**. Arrow **1954** directs execution when the determination is ☐No☐ to operation **1946**.

Operation **1926** performs receiving the patient prescription order message from the first patient. Arrow **1928** directs execution from operation **1926** to operation **1930**. Operation **1930** determines if the patient prescription order message from the first patient is compatible with the embedded prescription contained in the received patient response message. Arrow **1932** directs execution from operation **1930** to operation **1934**. Arrow **1932** directs execution when the determination is ☐Yes☐ to operation **1934**. Arrow **1956** directs execution when the determination is ☐No☐ to operation **1946**.

15 Operation **1934** determines if the patient prescription order received from the first patient authorizes the prescription order. Arrow **1936** directs execution from operation **1934** to operation **1938**. Arrow **1936** directs execution when the determination is ☐Yes☐ to operation **1938**. Arrow **1958** directs execution when the determination is ☐No☐ to operation **1946**.

20 Operation **1938** determines a first pharmacy from the patient prescription order. Arrow **1940** directs execution from operation **1938** to operation **1942**. Operation **1942** performs generates and sends the prescription order message to the first pharmacy based upon the received patient response message and the received patient prescription order message. Arrow **1944** directs execution from operation **1942** to operation **1946**. Operation **1946** terminates the operations of this flowchart.

Figure **50B** depicts a flowchart of further details of **1324** of Figure **30A** supporting generating a pharmacy prescription order in accordance with certain embodiments.

30 Arrow **1960** directs the flow of execution from starting operation **1324** to operation **1962**. Operation **1962** determines if the processed, received patient prescription order is compatible with the processed, received physician

5 prescription. Arrow **1964** directs execution when the determination is 'Yes' to operation **1966**. Arrow **1978** directs usage when the determination is 'No' to operation **1970**.

10 Operation **1966** generates a pharmacy prescription order message from the processed, received physician prescription message and the processed, received patient prescription order. Arrow **1968** directs execution from operation **1966** to operation **1970**. Operation **1970** terminates the operations of this flowchart.

15 Figure **50C** depicts a flowchart of further details of **1326** of Figure **30A** supporting sending a pharmacy prescription order to a pharmacy in accordance with certain embodiments.

20 Arrow **1980** directs the flow of execution from starting operation **1326** to operation **1962**. Operation **1962** determines if the processed, received patient prescription order is compatible with the processed, received physician prescription. Arrow **1984** directs execution from operation **1962** to operation **1986**. Arrow **1984** directs execution when the determination is ☐Yes☐ to operation **1986**. Arrow **1998** directs usage when the determination is ☐No☐ to operation **1994**.

25 Operation **1986** performs determine the first pharmacy from the processed, received patient prescription order. Arrow **1988** directs execution from operation **1986** to operation **1990**. Operation **1990** performs sending the pharmacy prescription order message to the first pharmacy. Arrow **1992** directs execution from operation **1990** to operation **1994**. Operation **1994** terminates the operations of this flowchart.

30 Figure **50D** depicts a flowchart of further details of **1106** of Figure **23** supporting determining a routing chain of physician extenders and embedding the routing chain into a second patient query in accordance with certain embodiments.

Arrow **2010** directs the flow of execution from starting operation **1106** to operation **2012**. Operation **2012** determines a routing chain of physician extenders. Arrow **2014** directs execution from operation **2012** to operation **2016**. Operation **2016** embeds the routing chain of physician extenders into the second medical query. Arrow **2018** directs execution from operation **2016** to operation **2020**. Operation **2020** terminates the operations of this flowchart.

Note that a routing chain of physician extenders is a collection of at least one physician extender to whom the second patient query will be routed after the first physician extender has added their proposed response to the patient query.

Figure **50E** depicts a flowchart of further details of **1178** of Figure **24** supporting determining successor physician extenders in an embedded physician extender routing chain, generating a successor medical query message with embedded proposed patient response and sending the successor patient medical query to the successor physician extender.

Arrow **2030** directs the flow of execution from starting operation **1178** to operation **2032**. Operation **2032** determines if there is a successor physician extender in the embedded physician extender chain. Arrow **2034** directs execution from operation **2032** to operation **2036**. Arrow **2034** directs execution when the determination is ☐Yes☐ to operation **2032**. Arrow **2048** directs execution when the determination is ☐No☐ to operation **2044**.

Operation **2036** generates the successor medical query message with the embedded proposed patient response. Arrow **2038** directs execution from operation **2036** to operation **2040**. Operation **2040** send the successor patient medical query to the successor physician extender. Arrow **2042** directs execution from operation **2040** to operation **2044**. Operation **2044** terminates the operations of this flowchart.

Figure **50F** depicts a flowchart of further details of **646** of Figure **6** supporting generating a routing tree of physicians with first physician final destination and

- 5 source list of physicians, generating and sending a source medical query to each physician included in the physician source list.

Arrow **2060** directs the flow of execution from starting operation **646** to operation **2062**. Operation **2062** performs generating a routing tree of physicians with the first physician the final destination of the routing tree and a source list of  
10 physicians of the routing tree. Arrow **2064** directs execution from operation **2062** to operation **2066**. Operation **2066** performs generating and sending a source medical query for and to each physician belonging to the source list of the routing tree. Arrow **2068** directs execution from operation **2066** to operation **2070**. Operation **2070** terminates the operations of this flowchart.

15 Additional Discussion of Primary Terms as used herein:

A service profile of a client is a collection of information residing in some computer accessible media which from time to time a computer may be able to access.

The service profiler process is the system-wide activities which are performed in  
20 an automated fashion by the service-flow engine to facilitate the service communication between clients, service providers, service extenders and suppliers to support at least the following: service queries, replies and transactions involved in service recommendations.

The service-flow engine is the mechanism performing the collection of operations  
25 known as the service profiler process. It has at least one address on the network shared with clients, service providers, service extenders and suppliers. Note that this shared network may in fact be partitioned into a collection of networks, each possessing gateways, firewalls and the like as is well known in the art. Note that the service-flow engine may include but is not limited to one computer, and in  
30 fact, in certain embodiments preferably involves more than one server computer as will be discussed later.



A client as used herein will have two components of meaning: The first component being the entity about whom the service profile, query messages, response message and service recommendations are directed; the second is a responsible individual acting for the client in all the transactions, such as generating the query messages, receiving and considering the response messages and ordering the service recommendations. Note that a list of the first component entities includes but is not limited to people, corporations, companies, organizations, as well as real estate, machinery including but not limited to automobiles, computer systems, web sites, software, telephones, communications networks and systems.

Further embodiments of the invention support the service-flow engine creating routing chains of service extenders starting with a first service extender proceeding through successor service provider extenders until the routing chain terminates with a service provider reviewing the collective proposed client response. The routing chain may be generated by the service-flow engine based upon the client's educated query message.

Further embodiments of the invention support the service-flow engine creating routing trees of service providers with patent query messages starting with a source list of service providers, possibly routing to intermediate service providers and culminating in a first service provider who reviews the collective service provider responses to their respective client service queries.

Figure 51 depicts a flow diagram of an embodiment of the invention in accordance with certain embodiments. Client **2200** is the primary initiator of this invention. Arrow **2202** depicts the interactions of client **2200** to create the educated query message **2204**. The educated query message **2204** is an optimized service query directed by the client to address concerns and conditions involving the client. Arrow **2206** depicts the sending of educated query message **2204** to the service profile **2208** which is managed by the service profiler

5 process. The service-flow engine performs the various service profiler process operations. More will be said about the service-flow engine shortly. Arrow **2210** depicts interactive communication between the service-flow engine **2208** and the service providers **2212** primarily regarding the service profiler. Service providers **2212** are the central destination of client generated educated service query  
10 messages as sent by **2210** from the service profiler process to the service provider **2212**. Arrow **2214** depicts the response of service provider **2212** to the educated query message, generating a consultative response **2216**. Consultation **2216** provides the basis of the client response message **2226**. Arrow **2218** depicts the inclusion of the service provider consultative response  
15 **2216** with educational material **2220**. Educational material **2220** is included in certain, but not all cases, to meet mandated regulations as well as provide the service providers a mechanism to distribute standard material regarding various conditions and treatments. Arrow **2222** depicts the service-flow engine activities required to incorporate the consultative response and included materials **2220**  
20 with billing information (charging) **2224**. Charging **2224** performs tasks of notifying a client service profile of the consultative transaction, what was the query, response, educational materials included and the service expenses. Arrow **2226** depicts the actual patent response message derived from **2224** query, service provider response, educational materials included and the service  
25 expenses sent to client **2200**.

Arrow **2230** depicts the message information flow from the service-flow engine to service extender **2232**. Service extenders **2232** perform a number of service tasks under the direction of service providers **2212**. Arrow **2234** depicts the sending of proposed client response messages generated by service extenders  
30 **2232** to a service provider **2212**. Arrow **2240** depicts another message information flow from the service-flow engine to a service assistant **2242**. While service assistants are service extenders, a service assistant **2242** performs a specific additional task distinguishing them from other service extenders, such as

5 service provider assistants and administrators. Service assistant **2242** can propose service recommendation refills for example. Arrow **2244** depicts the sending of proposed client response message, which may further include proposed embedded service recommendation refills, from service assistant **2242** to service provider **2246**.

10 Service provider **2212** performs a review on the proposed client response messages from service extenders, including service assistants, as delivered by arrows **2234** and **2244**. Template replies **2246** offer the capability for service providers to optimize the quality and efficiency of response in making many standard replies. Arrow **2248** depicts the interaction between template replies **2246** and service provider **2212**.

15 Arrow **2250** depicts the information and activity flow based upon the consultative response **2216** and the placing of a service recommendation message **2252**. Service recommendation message **2252** is created based upon the service provider's consultative response **2216**, which in turn is based upon the client's service query message and possibly a service assistant's proposed service recommendation refill. Arrow **2254** depicts sending a service recommendation message **2252** to ordering process **2256**. Client **2200** receives the patent response message **2226**, and may respond by ordering the embedded service recommendation, which is depicted by arrow **2264** indicating a client service recommendation message sent to ordering process **2256**. Ordering process **2256** waits until both the service provider service recommendation message **2254** and client service recommendation message **2264** have been received and processed before the order **2258** is actually placed with supplier **2260**. Supplier **2260** sends the service recommendation to client **2300** as indicated by arrow **2362**.

Figure **52** depicts an interactive flow between a client using a first message interface, service-flow engine performing a service profiler process and service

5 provider using a second message interface in accordance with an embodiment of the invention. Client **2300** interacts **2302** with client operated computer **2304**, which can access **2306** and perform the operations of first message interface **2308**. Service provider **2350** interacts **2352** with service provider operated computer **2354**, which can access **2356** and perform the operations of second  
10 message interface **2358**. Service extender **2400** interacts **2402** with service extender operated computer **2404**, which can access **2406** and perform the operations of second message interface **2408**.

Client **2300** using first message interface **2308** on client operated computer **2304** generates **2310** educated query message **2312** and sends it **2314** to service-flow  
15 engine **2320** where it is received by service profiler process **2322**. Service profiler process **2322** generates **2324** client message log entry **2326**, which is added **2328** to the client service profile **2330**. Service profiler process **2322** further generates **2340** client service query message **2342**, which is sent **2344** to service provider operated computer **2354**.

20 Service provider **2350** using second message interface **2358** on service provider operated computer **2354** receives and responds to the client service query message **2342**, generating **2360** a client response message **2362**, which in certain embodiments is sent **2364** directly to the client operated computer **2304**. In certain alternative embodiments, client response message **2362** is sent **2370**  
25 to the service-flow engine, where the service profiler process **2322** then sends **2372** a version to the client operated computer **2304**. Service provider **2350** using second message interface **2358** on service provider operated computer **2354** further responds to the client service query message **2342**, generating a client response message with appended service provider billing data **2382**, which  
30 is sent **2384** to the service-flow engine, where the service profiler process **2322** then generates **2390** a client response log entry **2392** which is added **2394** to the client service profile **2330**.

5 In certain situations, a service recommendation is embedded into client response message **2362** by the service provider **2350** using second message interface **2358** on service provider operated computer **2354** in response to the client service query message **2342**, which embedded into the client response message **2362**. Service provider **2350** using second message interface **2358** on service  
 10 provider operated computer **2354** also generates **2480** service provider service recommendation message **2482**, which is sent **2484** to the service-flow engine using the service profiler process **2322**. Client **2300** using first message interface **2308** on client operated computer **2304** generates **2490** client order message **2492** and sends it **2494** to service-flow engine **2320** where it is received by  
 15 service profiler process **2322**. Once both service provider service recommendation message **2482** and client order message **2492** have been received and authenticated, the medial profiler process **2322** generates **2500** a supplier service order message **2502** which is sent **2504** to the supplier computer **2506**.

20 Service profiler process **2322** accesses **2510** the client service profile **2330** to generate **2512** client billing report message **2514** which is sent **2516** to billing system **2518**. Note that the billing system **2518** in certain embodiments is a separate system element external to the service-flow engine. In certain alternative embodiments, billing system **2518** resides within the operations  
 25 performed by the service-flow engine. In certain further embodiments, billing system **2518** is part of the service profiler process.

Note that in the flowcharts included herein, the starting operation of a flowchart may perform operations to allocate systems resources for use by the subsequent operations of the flowchart in certain embodiments. The starting operation of a  
 30 flowchart may further perform initialize systems resources in certain embodiments.

Note also that in the flowcharts included herein, the terminating or exit operation of a flowchart may perform operations to release allocated systems resources used by the subsequent operations of the flowchart in certain embodiments. The terminating operation of a flowchart may further perform a "return" operation in certain embodiments. Alternatively, the terminating operation of a flowchart may not perform a "return" operation in certain embodiments.

Figure **52A** depicts an interactive flow between a client using a first message interface, service-flow engine performing a service profiler process and service provider using a second message interface in accordance with a further embodiment of the invention. Client **2300** interacts **2302** with client operated computer **2304**, which can access **2306** and perform the operations of first message interface **2308**. Service provider **2350** interacts **2352** with service provider operated computer **2354**, which can access **2356** and perform the operations of second message interface **2358**. Service extender **2400** interacts **2402** with service extender operated computer **2404**, which can access **2406** and perform the operations of second message interface **2408**.

Client **2300** using first message interface **2308** on client operated computer **2304** generates **2310** educated query message **2312** and sends it **2314** to service-flow engine **2320** where it is received by service profiler process **2322**. Service profiler process **2322** generates **2324** client message log entry **2326**, which is added **2328** to the client service profile **2330**. Service profiler process **2322** further generates **2340** client service query message **2342**, which is sent **2344** to service provider operated computer **2354**.

Service provider **2350** using second message interface **2358** on service provider operated computer **2354** receives and responds to the client service query message **2342**, generating **2360** a client response message **2362**, which in certain embodiments is sent **2364** directly to the client operated computer **2304**. In certain alternative embodiments, client response message **2362** is sent **2370**

5 to the service-flow engine, where the service profiler process **2322** then sends  
**2372** a version to the client operated computer **2304**. Service provider **2350**  
using second message interface **2358** on service provider operated computer  
**2354** further responds to the client service query message **2342**, generating a  
client response message with appended service provider billing data **2382**, which  
10 is sent **2384** to to the service-flow engine, where the service profiler process  
**2322** then generates **2390** a client response log entry **2392** which is added **2394**  
to the client service profile **2330**.

In certain situations, a service recommendation is embedded into client response  
message **2362** by the service provider **2350** using second message interface  
15 **2358** on service provider operated computer **2354** in response to the client  
service query message **2342**, which embedded into the client response message  
**2362**. Service provider **2350** using second message interface **2358** on service  
provider operated computer **2354** also generates **2480** service provider service  
recommendation message **2482**, which is sent **2484** to the service-flow engine  
20 using the service profiler process **2322**. Client **2300** using first message interface  
**2308** on client operated computer **2304** generates **2490** client order message  
**2492** and sends it **2494** to service-flow engine **2320** where it is received by  
service profiler process **2322**. Once both service provider service  
recommendation message **2482** and client order message **2492** have been  
25 received and authenticated, the medial profiler process **2322** generates **2500** a  
supplier service order message **2502** which is sent **2504** to the supplier computer  
**2506**.

Service profiler process **2322** accesses **2510** the client service profile **2330** to  
generate **2512** client billing report message **2514** which is sent **2516** to billing  
30 system **2518**. Note that the billing system **2518** in certain embodiments is a  
separate system element external to the service-flow engine. In certain  
alternative embodiments, billing system **2518** resides within the operations

5 performed by the service-flow engine. In certain further embodiments, billing system **2518** is part of the service profiler process.

Service profiler process **2322** further generates **2400** a second client service query message **2402**, which is sent **2404** to service extender operated computer **2414**. Service extender **2410** using third message interface **2418** on service  
 10 provider operated computer **2414** receives and responds to the second client service query message **2412**, generating **2430** a proposed client response message **2432**, which is sent **2434** directly to the service provider operated computer **2354**, where it is inserted into the client service query message **2342**. In certain alternative embodiments, client response message **2432** is sent **2436**  
 15 to the service-flow engine, where the service profiler process **2322** then sends a version to the service provider operated computer **2354**. Service extender **2410** using third message interface **2418** on service provider operated computer **2414** further responds **2440** to the second client service query message **2402**, generating a proposed client response message with appended service extender  
 20 billing data **2442**, which is sent **2444** to the service-flow engine, where the service profiler process **2322** then generates **2450** a proposed client response with appended service extender billing data log entry **2452** which is added **2454** to the client service profile **2330**.

Figure **53** depicts a flowchart of operations supporting the generation and  
 25 sending of an educated query by a client using the first message interface in accordance with embodiments supporting Figure **52**. Operation **2600** starts the operations of this flowchart. Arrow **2602** directs the flow of execution from operation **2600** to operation **2604**. Operation **2604** performs generating of an educated query message. Arrow **2606** directs execution from operation **2604** to  
 30 operation **2608**. Operation **2608** performs sending the educated query message to the service-flow engine. Arrow **2610** directs execution from operation **2608** to operation **2612**. Operation **2612** terminates the operations of this flowchart.



5 Figure 54 depicts a flowchart of operations supporting the reception, processing,  
logging of the educated query message from the client, and the generation and  
sending of the client service query message to a service provider by the service  
profiler process performed by the service-flow engine in accordance with  
embodiments supporting Figure 52. Operation 2630 starts the operations of this  
10 flowchart. Arrow 2632 directs the flow of execution from operation 2630 to  
operation 2634. Operation 2634 performs receiving the educated query  
message at the service-flow engine. Arrow 2636 directs execution from  
operation 2634 to operation 2638. Operation 2638 performs processing the  
received educated query message to create the processed, received educated  
15 query message. Arrow 2640 directs execution from operation 2638 to operation  
2642. Operation 2642 performs generating a client service query message.  
Arrow 2644 directs execution from operation 2642 to operation 2646. Operation  
2646 performs sending the client service query message to first service provider  
at corresponding service provider address. Arrow 2648 directs execution from  
20 operation 2646 to operation 2650. Operation 2650 terminates the operations of  
this flowchart.

In certain embodiments, operation 646 further includes selecting a first service  
provider. In certain further embodiments, operation 646 further includes  
selecting a first service provider based upon the received educated query  
25 message. In certain further embodiments, operation 646 further includes  
selecting a first service provider based upon the processed, received educated  
query message.

Arrow 2652 directs the flow of execution from starting operation 2638 to  
operation 2654. Operation 2654 performs generating a client message log entry  
30 in the client service profile. Arrow 2656 directs execution from operation 2654 to  
operation 2650.

5 Figure 55 depicts a flowchart of operations supporting reception, processing and viewing the client service query message by the second message interface for the service provider in accordance with embodiments supporting Figure 52. Operation 2670 starts the operations of this flowchart. Arrow 2672 directs the flow of execution from operation 2670 to operation 2674. Operation 2674  
10 performs receiving the client query message. Arrow 2676 directs execution from operation 2674 to operation 2678. Operation 2678 performs processing the received client service query message to create the processed, received client service message. Arrow 2680 directs execution from operation 2678 to operation 2682. Operation 2682 performs generating a service-provider-viewable client service query message from the processed, received client  
15 service query message. Arrow 2684 directs execution from operation 2682 to operation 2686. Operation 2686 performs displaying the service-provider-viewable client service query message. Arrow 2688 directs execution from operation 2686 to operation 2690. Operation 2690 terminates the operations of this flowchart.  
20

Figure 56 depicts a flowchart of operations supporting reception, generation and sending a client response message, as well as copying the client response message with an appended service provider billing data to the service-flow engine in accordance with embodiments supporting Figure 52. Operation 2700  
25 starts the operations of this flowchart. Arrow 2702 directs the flow of execution from operation 2700 to operation 2704. Operation 2704 performs responding to the service-provider-viewable client service query message to create a first-service-provider response. Arrow 2706 directs execution from operation 2704 to operation 2708. Operation 2708 performs generating a client response message  
30 from the first-service-provider response. Arrow 2710 directs execution from operation 2708 to operation 2712. Operation 2712 performs sending the client response message to the client at the corresponding client address. Arrow 2714

5 directs execution from operation **2712** to operation **2716**. Operation **2716** terminates the operations of this flowchart.

Arrow **2720** directs the flow of execution from starting operation **2708** to operation **2722**. Operation **2722** performs copying the client response message with appended service provider billing data to service-flow engine. Arrow **2724**  
10 directs execution from operation **2722** to operation **2716**.

Figure **57** depicts a flowchart of operations supporting the reception, processing, logging the copied client response message with an appended service provider billing data by the service profiler process performed by the service-flow engine in accordance with embodiments supporting Figure **52**. Operation **2740** starts the  
15 operations of this flowchart. Arrow **2742** directs the flow of execution from operation **2740** to operation **2744**. Operation **2744** performs receiving the copied client response message with appended service provider billing data. Arrow **2746** directs execution from operation **2744** to operation **2748**. Operation **2748** performs processing the received, copied client response message with  
20 appended service provider billing data to create the processed, received, copied client response message with appended service provider billing data. Arrow **2750** directs execution from operation **2748** to operation **2752**. Operation **2752** performs generating a client response log entry in client service profile from the processed, received, copied client response message with appended service  
25 provider billing data. Arrow **2754** directs execution from operation **2752** to operation **2756**. Operation **2756** terminates the operations of this flowchart.

Figure **58** depicts a flowchart of operations supporting reception, processing and display of the client response message using the first message interface on the client operated computer in accordance with embodiments supporting Figure **52**.  
30 Operation **2770** starts the operations of this flowchart. Arrow **2772** directs the flow of execution from operation **2770** to operation **2774**. Operation **2774** performs receiving the client response message. Arrow **2776** directs execution

5 from operation **2774** to operation **2778**. Operation **2778** performs processing the received client response message, to create a processed, received client response message. Arrow **2780** directs execution from operation **2778** to operation **2782**. Operation **2782** performs displaying the processed, received client response message. Arrow **2784** directs execution from operation **2782** to  
10 operation **2786**. Operation **2786** terminates the operations of this flowchart.

Figure **59** depicts a flowchart of further details regarding operation **2604**, generation of an educated query message by the first message interface in accordance with embodiments supporting Figure **53**. Arrow **2800** directs the flow of execution from starting operation **2604** to operation **2802**. Operation **2802**  
15 performs providing a client-to-profiler authentication key. Arrow **2804** directs execution from operation **2802** to operation **2806**. Operation **2806** performs encrypting the educated query message with client-to-profiler authentication key. Arrow **2808** directs execution from operation **2806** to operation **2810**. Operation **2810** terminates the operations of this flowchart.

20 Figure **60** depicts a flowchart of further details regarding operation **2638**, processing the educated query message using the service profiler process performed by the service-flow engine in accordance with embodiments supporting Figure **54**. Arrow **2820** directs the flow of execution from starting operation **2638** to operation **2822**. Operation **2822** performs providing a profiler-  
25 from-client authentication key. Arrow **2824** directs execution from operation **2822** to operation **2826**. Operation **2826** performs decrypting the received, educated query message with profiler-from-client authentication key. Arrow **2828** directs execution from operation **2826** to operation **2830**. Operation **2830** terminates the operations of this flowchart.

30 Figure **61** depicts a flowchart of further details regarding operation **2642**, generation of a client service query message by the service profiler process performed by the service-flow engine in accordance with embodiments

supporting Figure 54. Arrow **2850** directs the flow of execution from starting operation **2642** to operation **2852**. Operation **2852** performs providing profiler-from-first-service-provider authentication key. Arrow **2854** directs execution from operation **2852** to operation **2856**. Operation **2856** performs encrypting client service query message with profiler-from-first-service-provider authentication key. Arrow **2858** directs execution from operation **2856** to operation **2860**. Operation **2860** terminates the operations of this flowchart.

Figure 62 depicts a flowchart of further details regarding operation **2678**, processing the received client service query message by the second message interface in accordance with embodiments supporting Figure 55. Arrow **2880** directs the flow of execution from starting operation **2678** to operation **2882**. Operation **2882** performs providing a first-service-provider-from-profiler authentication key. Arrow **2884** directs execution from operation **2882** to operation **2886**. Operation **2886** performs decrypting the received client service query message with the first-service-provider-from-profiler authentication key. Arrow **2888** directs execution from operation **2886** to operation **2890**. Operation **2890** terminates the operations of this flowchart.

Figure 63 depicts a flowchart of further details regarding operation **2722**, copying the client response message with appended service provider billing data to the service-flow engine by the second message interface in accordance with embodiments supporting Figure 56. Arrow **2900** directs the flow of execution from starting operation **2722** to operation **2902**. Operation **2902** performs providing a first-service-provider-to-profiler authentication key. Arrow **2904** directs execution from operation **2902** to operation **2906**. Operation **2906** performs encrypting the client response message with appended service provider billing data with the first-service-provider-to-profiler authentication key. Arrow **2908** directs execution from operation **2906** to operation **2910**. Operation **2910** performs sending first-service-provider-to-profiler encrypted client response message with appended service provider billing data to the service-flow engine.

5 Arrow **2912** directs execution from operation **2910** to operation **2914**. Operation **2914** terminates the operations of this flowchart.

Figure **64** depicts a flowchart of further details regarding operation **2748**, processing the received, copied the client response message with appended service provider billing data using the service profiler process performed by the service-flow engine in accordance with embodiments supporting Figure 57. Arrow **2930** directs the flow of execution from starting operation **2748** to operation **2932**. Operation **2932** performs providing a profiler-from-first-service-provider authentication key. Arrow **2934** directs execution from operation **2932** to operation **2936**. Operation **2936** performs decrypting the received, copied client response message with appended service provider billing data with the profiler-from-first service provider authentication key to create the processed, received client response message with appended service provider billing data. Arrow **2938** directs execution from operation **2936** to operation **2940**. Operation **2940** terminates the operations of this flowchart.

20 Figure **65** depicts a flowchart of further details regarding operation **2708**, generating client response message using the second message interface in accordance with embodiments supporting Figure 56. Arrow **2950** directs the flow of execution from starting operation **2708** to operation **2952**. Operation **2952** performs providing first-service-provider-to-client authentication key. Arrow **2954** directs execution from operation **2952** to operation **2956**. Operation **2956** performs generating an unencrypted client response message from the service-provider-viewable client service query message and the first-service-provider response. Arrow **2958** directs execution from operation **2956** to operation **2960**. Operation **2960** performs encrypt the unencrypted client response message with the first-service-provider-to-client authentication key to create the client response message. Arrow **2962** directs execution from operation **2960** to operation **2964**. Operation **2964** terminates the operations of this flowchart.

5 Note that operations **2952** and **2956** may be performed either in the order presented by this flowchart, or in certain alternative embodiments, in the reverse order to that shown, or further alternatively, concurrently with each other.

Figure **66** depicts a flowchart of further details regarding operation **2778**, processing the received client response message using the first message  
 10 interface in accordance with embodiments supporting Figure **58**. Arrow **2980** directs the flow of execution from starting operation **2778** to operation **2982**. Operation **2982** performs providing a client-from-first-service-provider authentication key. Arrow **2984** directs execution from operation **2982** to operation **2986**. Operation **2986** performs decrypting the received client  
 15 response message with the client-from-first-service-provider authentication key to create the processed, received client response message. Arrow **2988** directs execution from operation **2986** to operation **2990**. Operation **2990** terminates the operations of this flowchart.

Figure **67** depicts a flowchart of further details regarding operation **2712**, sending  
 20 the client response message with appended service provider billing data using the service profiler process performed by the service-flow engine in accordance with embodiments supporting Figure **56**. Arrow **3000** directs the flow of execution from starting operation **2712** to operation **3002**. Operation **3002** performs sending client response message destined to client to service-flow engine.  
 25 Arrow **3004** directs execution from operation **3002** to operation **3006**. Operation **3006** terminates the operations of this flowchart.

Figure **68** depicts a flowchart of further details regarding operation **2708**, generating the client response message using the second message interface in accordance with embodiments supporting Figure **56**. Arrow **3010** directs the flow  
 30 of execution from starting operation **2708** to operation **3012**. Operation **3012** performs providing the first-service-provider-to-profiler authentication code. Arrow **3014** directs execution from operation **3012** to operation **3016**. Operation

5     **3016** performs providing the client address as destination address within the client response message, to create an unencrypted client response message with client address destination. Arrow **3018** directs execution from operation **3016** to operation **3020**. Operation **3020** performs encrypting the unencrypted client response message with the first-service-provider-to-profiler authentication  
10     code to create the client response message destined for the client at the corresponding client address. Arrow **3022** directs execution from operation **3020** to operation **3024**. Operation **3024** terminates the operations of this flowchart.

Note that operations **3012** and **3016** in certain alternative embodiments may be performed in reverse order, and in certain further alternative embodiments, may  
15     be concurrently performed.

Figure **69** depicts a flowchart of operations of the service profiler process performed by the service-flow engine in accordance with alternative embodiments supporting Figure **52**. Operation **3040** starts the operations of this flowchart. Arrow **3042** directs the flow of execution from operation **3040** to  
20     operation **3044**. Operation **3044** performs receiving the client response message destined for the client at the corresponding client address. Arrow **3046** directs execution from operation **3044** to operation **3048**. Operation **3048** performs processing the received client response message destined for the client at the corresponding client address, to create the client response message for the client  
25     at the corresponding client address. Arrow **3050** directs execution from operation **3048** to operation **3052**. Operation **3052** performs sending the client response message to the client at the corresponding client address. Arrow **3054** directs execution from operation **3052** to operation **3056**. Operation **3056** terminates the operations of this flowchart.

30     Figure **70** depicts a flowchart of further details regarding operation **3048**, processing the client response message destined for the client using the service profiler process performed by the service-flow engine in accordance with



embodiments supporting Figure 69. Arrow 3070 directs the flow of execution from starting operation 3048 to operation 3072. Operation 3072 performs providing a profiler-from-first-service-provider authentication key. Arrow 3074 directs execution from operation 3072 to operation 3076. Operation 3076 performs decrypting the received client response message destined for the client at the corresponding client address to create the processed, received client response message for the client at the corresponding client address. Arrow 3078 directs execution from operation 3076 to operation 3080. Operation 3080 terminates the operations of this flowchart.

Figure 71 depicts a flowchart of further details regarding operation 2642, generating a client service query message using the service profiler process performed by the service-flow engine in accordance with embodiments. Arrow 3100 directs the flow of execution from starting operation 2642 to operation 3102. Operation 3102 performs selecting a first service extender from the service extenders. Arrow 3104 directs execution from operation 3102 to operation 3106. Operation 3106 performs generating a second client service query message for the first service extender. Arrow 3108 directs execution from operation 3106 to operation 3110. Operation 3110 performs sending the second client service query message to the first service extender at the corresponding service extender address. Arrow 3112 directs execution from operation 3110 to operation 3114. Operation 3114 terminates the operations of this flowchart.

Note that in certain embodiments, operation 3102 is based upon the received educated query message. In certain further embodiments, operation 3102 is based upon the processed, received educated query message.

Figure 72 depicts a flowchart of operations using the third message interface on the service extender computer in accordance with embodiments supporting Figure 57. Operation 3150 starts the operations of this flowchart. Arrow 3152 directs the flow of execution from operation 3150 to operation 3154. Operation

5 **3154** performs receiving a second client message by first service extender operating a computer at the corresponding service extender address. Arrow **3156** directs execution from operation **3154** to operation **3158**. Operation **3158** performs processing the received second client service query message to create a processed, received second client service query message. Arrow **3160** directs  
 10 execution from operation **3158** to operation **3162**. Operation **3162** performs generating a service extender-viewable client service query message from the processed, received second client service query message. Arrow **3164** directs execution from operation **3162** to operation **3166**. Operation **3166** performs displaying the service extender-viewable service query message. Arrow **3168**  
 15 directs execution from operation **3166** to operation **3170**. Operation **3170** performs responding to the service extender-viewable service query message to create a service extender response. Arrow **3172** directs execution from operation **3170** to operation **3174**. Operation **3174** performs generating the proposed client response message from service extender response. Arrow **3176**  
 20 directs execution from operation **3174** to operation **3178**. Operation **3178** performs sending the proposed client response message to the first service provider at the corresponding service provider address. Arrow **3180** directs execution from operation **3178** to operation **3182**. Operation **3182** terminates the operations of this flowchart.

25 Figure **73** depicts a flowchart of further details regarding operation **2682**, generating the service-provider-viewable client service query message in accordance with embodiments supporting Figures **55**. Arrow **3200** directs the flow of execution from starting operation **2682** to operation **3202**. Operation **3202** performs receiving proposed client response message from first service  
 30 extender. Arrow **3204** directs execution from operation **3202** to operation **3206**. Operation **3206** performs processing the received client response message to create processed, received client response message. Arrow **3208** directs execution from operation **3206** to operation **3210**. Operation **3210** performs

5 inserting the processed, received proposed client response message as part of the service-provider-viewable client service query message. Arrow **3212** directs execution from operation **3210** to operation **3214**. Operation **3214** terminates the operations of this flowchart.

10 Figure **74** depicts a flowchart of further details regarding operation **2708**, generating the client response message using the second message interface in accordance with certain embodiments. Arrow **3220** directs the flow of execution from starting operation **2708** to operation **3222**. Operation **3222** performs reviewing the proposed client response message. Arrow **3224** directs execution from operation **3222** to operation **3226**. Operation **3226** terminates the operations of this flowchart.

15 Figure **75** depicts a flowchart of further operations embodying the third message interface in accordance with certain embodiments. Arrow **3240** directs the flow of execution from starting operation **3240** to operation **3242**. Operation **3242** performs generating a copied proposed client response message with appended service extender billing data from the service extender-viewable client service query message and first service extender response. Arrow **3244** directs execution from operation **3242** to operation **3246**. Operation **3246** performs sending copied proposed client response with appended service extender billing data to service-flow engine. Arrow **3248** directs execution from operation **3246** to operation **3250**. Operation **3250** terminates the operations of this flowchart.

20 Figure **76** depicts a flowchart of further operations embodied in the message profiler process in accordance with certain embodiments. Operation **3270** starts the operations of this flowchart. Arrow **3272** directs the flow of execution from operation **3270** to operation **3274**. Operation **3274** performs receiving the copied proposed client response message with the appended service extender billing data. Arrow **3276** directs execution from operation **3274** to operation **3278**. Operation **3278** performs processing the received copied proposed client

25

5 response message with the appended service extender billing data, to create a processed, received copied proposed client response message with the appended service extender billing data. Arrow **3280** directs execution from operation **3278** to operation **3282**. Operation **3282** performs generating a service extender log entry in the service profile of the client from the processed, received  
10 copied client response message with the appended service extender billing data. Arrow **3284** directs execution from operation **3282** to operation **3286**. Operation **3286** terminates the operations of this flowchart.

Figure **77** depicts a flowchart of further operations embodied in a second message interface in accordance with certain embodiments supporting service  
15 recommendations. Operation **3290** starts the operations of this flowchart. Arrow **3291** directs the flow of execution from operation **3290** to operation **3292**. Operation **3292** performs generating an embedded service recommendation. Arrow **3293** directs execution from operation **3292** to operation **3294**. Operation **3294** performs inserting the embedded service recommendation into client  
20 response message. Arrow **3295** directs execution from operation **3294** to operation **3296**. Operation **3296** performs generating a service provider service recommendation message from the embedded service recommendation. Arrow **3297** directs execution from operation **3296** to operation **3298**. Operation **3298** performs sending the service provider service recommendation message to the  
25 service-flow engine. Arrow **3299** directs execution from operation **3298** to operation **3300**. Operation **3300** terminates the operations of this flowchart.

Figure **78** depicts a flowchart of further operations embodied in a service profiler in accordance with certain embodiments supporting service recommendations. Operation **3305** starts the operations of this flowchart. Arrow **3306** directs the  
30 flow of execution from operation **3305** to operation **3307**. Operation **3307** performs maintaining a list of suppliers, each with a corresponding supplier address. Arrow **3308** directs execution from operation **3307** to operation **3309**. Operation **3309** terminates the operations of this flowchart.

5 Arrow **3310** directs the flow of execution from starting operation **3305** to operation **3311**. Operation **3311** performs integrating a service order. Arrow **3312** directs execution from operation **3311** to operation **3309**. Operation **3309** terminates the operations of this flowchart.

Note that arrows **3306** and **3310** may be concurrently active, the supplier list may  
10 be undergoing maintenance operations and the integration of service orders may be performed concurrently on either the same computer or distinct computers according to various embodiments of the invention.

Figure **78A** depicts a flowchart of further details regarding operation **3311**, integrating a service order in the service profiler process in accordance with  
15 embodiments supporting Figure **78**. Arrow **3315** directs the flow of execution from the starting of operation **3311** to operation **3316**. Operation **3316** performs receiving the service provider service recommendation message. Arrow **3317** directs execution from operation **3316** to operation **3318**. Operation **3318** performs processing the received service provider service recommendation  
20 message, to create a processed, received service provider service recommendation message.

Arrow **3319** directs execution from operation **3311** to operation **3320**. Operation **3320** performs receiving a client order message. Arrow **3321** directs execution from operation **3320** to operation **3322**. Operation **3322** performs processing the  
25 received client order message to create a processed, received client order message.

Arrow **3323** directs execution from operation **3322** to operation **3324**. Arrow **3330** directs execution from operation **3318** to operation **3324**. Note that in certain  
30 embodiments, both arrows **3323** and **3330** must perform their flow of execution before operation **3324** can execute. Operation **3324** performs generating a supplier service order message from the processed, received service provider service recommendation message and the processed, received client order

message. Arrow **3325** directs execution from operation **3324** to operation **3326**. Operation **3326** performs sending the supplier service order message to one of the suppliers at the corresponding supplier address. Arrow **3327** directs execution from operation **3326** to operation **3328**. Operation **3328** terminates the operations of this flowchart.

Figure **79** depicts a flowchart of further operations embodied in the first message interface in accordance with certain embodiments supporting service recommendations. Operation **3340** starts the operations of this flowchart. Arrow **3342** directs the flow of execution from operation **3340** to operation **3344**. Operation **3344** performs responding to the embedded service recommendation within the processed, received client response message. Arrow **3346** directs execution from operation **3344** to operation **3348**. Operation **3348** terminates the operations of this flowchart.

Arrow **3350** directs the flow of execution from starting operation **3340** to operation **3352**. Operation **3352** performs ordering the embedded service recommendation from the processed, received client response message. Arrow **3354** directs execution from operation **3352** to operation **3348**. Operation **3348** terminates the operations of this flowchart.

Note that in certain embodiments, the starting operation may act as a branching mechanism. Such a mechanism can be driven by client choices via a user interface, such as buttons or pull down menus being selected or pushed.

Figure **80** depicts a flowchart of further details of operation **3352**, ordering the embedded service recommendation of Figure **79**. Arrow **3360** directs the flow of execution from starting operation **3352** to operation **3362**. Operation **3362** performs generating a client service recommendation message from the processed, received client response message. Arrow **3364** directs execution from operation **3362** to operation **3366**. Operation **3366** performs sending the client service recommendation message to the service-flow engine. Arrow **3368**

5 directs execution from operation **3366** to operation **3370**. Operation **3370** terminates the operations of this flowchart.

Figure **81** depicts a flowchart of further details of operation **3170** of Figure **73**. Arrow **3380** directs the flow of execution from starting operation **3170** to operation **3382**. Operation **3382** performs generating a proposed embedded  
10 service recommendation refill in the proposed client response. Arrow **3384** directs execution from operation **3382** to operation **3386**. Operation **3386** terminates the operations of this flowchart.

Figure **82** depicts a flowchart of further details of operation **3222** of Figure **75**. Arrow **3400** directs the flow of execution from starting operation **3222** to operation **3402**. Operation **3402** performs reviewing the proposed embedded  
15 service recommendation refill. Arrow **3404** directs execution from operation **3402** to operation **3406**. Operation **3406** terminates the operations of this flowchart.

Figure **83** depicts a flowchart of further details of operation **3402** of Figure **82**. Arrow **3420** directs the flow of execution from starting operation **3402** to operation **3422**. Operation **3422** performs approving the proposed service  
20 recommendation refill. Arrow **3424** directs execution from operation **3422** to operation **3426**. Operation **3426** terminates the operations of this flowchart.

Arrow **3430** directs the flow of execution from starting operation **3402** to operation **3432**. Operation **3432** performs revising the proposed embedded  
25 service recommendation refill. Arrow **3434** directs execution from operation **3432** to operation **3426**. Operation **3426** terminates the operations of this flowchart.

Arrow **3440** directs the flow of execution from starting operation **3402** to operation **3442**. Operation **3442** performs deleting the proposed embedded service recommendation refill. Arrow **3444** directs execution from operation **3442**  
30 to operation **3426**. Operation **3426** terminates the operations of this flowchart.

5 Arrow **3450** directs the flow of execution from starting operation **3402** to operation **3452**. Operation **3452** performs generating a second embedded service recommendation. Arrow **3454** directs execution from operation **3452** to operation **3426**. Operation **3426** terminates the operations of this flowchart.

Note that in certain embodiments, the starting operation may act as a branching  
10 mechanism. Such a mechanism can be driven by client choices via a user interface, such as buttons or pull down menus being selected or pushed.

Figure **84** depicts a flowchart of further operations embodying the message profiler process in accordance with certain embodiments supporting billing clients. Operation **3470** starts the operations of this flowchart. Arrow **3472**  
15 directs the flow of execution from operation **3470** to operation **3474**. Operation **3474** performs generating a billing report from the client service profile. Arrow **3476** directs execution from operation **3474** to operation **3478**. Operation **3478** terminates the operations of this flowchart.

Figure **85** depicts a flowchart of further operations embodying the message profiler process in accordance with certain embodiments further supporting billing clients. Operation **3490** starts the operations of this flowchart. Arrow **3492**  
20 directs the flow of execution from operation **3490** to operation **3494**. Operation **3494** performs sending the billing report to the billing system. Arrow **3496** directs execution from operation **3494** to operation **3498**. Operation **3498** terminates the  
25 operations of this flowchart.

Figure **86** depicts a flowchart of further operations embodying a billing process in accordance with certain embodiments. Operation **3510** starts the operations of this flowchart. Arrow **3512** directs the flow of execution from operation **3510** to operation **3514**. Operation **3514** performs receiving the billing report for the  
30 client. Arrow **3516** directs execution from operation **3514** to operation **3518**. Operation **3518** performs generating a bill for the client based from the received



5 billing report for the client. Arrow **3520** directs execution from operation **3518** to operation **3522**. Operation **3522** terminates the operations of this flowchart.

Figure **87** depicts a flowchart of further details of operation **3518** of Figure **86**. Arrow **3540** directs the flow of execution from starting operation **3518** to operation **3542**. Operation **3542** performs generating a personal bill for the client. Arrow **3544** directs execution from operation **3542** to operation **3546**.  
10 Operation **3546** terminates the operations of this flowchart.

Arrow **3550** directs the flow of execution from starting operation **3518** to operation **3552**. Operation **3552** performs generating an insurance bill for the client to corresponding insurance provider. Arrow **3554** directs execution from  
15 operation **3552** to operation **3546**. Operation **3546** terminates the operations of this flowchart.

Note that a client may not have insurance, so that in such circumstances, no insurance bills would be generated. Note also, that in certain circumstances, there may be an overall insuring, such as a governmental agency, fully paying for the health costs. In such circumstances, no personal service bill might be  
20 generated. In certain alternative embodiments, the performing of these operations might not lead to output of one or the other kinds of service bills.

Figure **88** depicts a flowchart of further details of operation **2704** of Figure **56** supporting a service provider requesting a second opinion in accordance with certain embodiments. Arrow **3570** directs the flow of execution from starting  
25 operation **2704** to operation **3572**. Operation **3572** performs generating a first-service-provider-second opinion request message. Arrow **3574** directs execution from operation **3572** to operation **3576**. Operation **3576** performs sending the first-service-provider-second opinion request message to the second service  
30 provider at the corresponding service provider address. Arrow **3578** directs execution from operation **3576** to operation **3580**. Operation **3580** terminates the operations of this flowchart.

Figure 89 depicts a flowchart of operations embodied in the second message interface supporting a second service provider and a second opinion request in accordance with certain embodiments. Operation 3600 starts the operations of this flowchart. Arrow 3602 directs the flow of execution from operation 3600 to operation 3604. Operation 3604 performs receiving the first-service-provider-second opinion request message. Arrow 3606 directs execution from operation 3604 to operation 3608. Operation 3608 performs processing the received, first-service-provider-second opinion request message to create the processed, received first-service-provider-second opinion request. Arrow 3610 directs execution from operation 3608 to operation 3612. Operation 3612 performs displaying the processed, received first-service-provider-second-opinion request. Arrow 3614 directs execution from operation 3612 to operation 3616. Operation 3616 performs responding to the displayed, processed, received first-service-provider-second opinion request to create a second opinion response. Arrow 3618 directs execution from operation 3616 to operation 3620. Operation 3620 performs generating a second opinion message from the second opinion response. Arrow 3622 directs execution from operation 3620 to operation 3624. Operation 3624 performs sending the second opinion message to the first-service-provider at the corresponding service provider address. Arrow 3626 directs execution from operation 3624 to operation 3628. Operation 3628 terminates the operations of this flowchart.

Figure 90 depicts a flowchart of operations embodied in a second message interface supporting maintaining a collection of client response templates in accordance with certain embodiments. Operation 3640 starts the operations of this flowchart. Arrow 3642 directs the flow of execution from operation 3640 to operation 3644. Operation 3644 performs creating a client response template. Arrow 3646 directs execution from operation 3644 to operation 3648. Operation 3648 terminates the operations of this flowchart.

5 Arrow **3650** directs the flow of execution from starting operation **3640** to operation **3652**. Operation **3652** performs editing one of the client response templates. Arrow **3654** directs execution from operation **3652** to operation **3648**. Operation **3648** terminates the operations of this flowchart.

Arrow **3660** directs the flow of execution from starting operation **3640** to  
10 operation **3662**. Operation **3662** performs deleting one of the client response templates. Arrow **3664** directs execution from operation **3662** to operation **3648**. Operation **3648** terminates the operations of this flowchart.

Note that in certain embodiments, the starting operation may act as a branching  
mechanism. Such a mechanism can be driven by client choices via a user  
15 interface, such as buttons or pull down menus being selected or pushed.

Figure **91** depicts a flowchart of further details of operation **2704** of Figure **56**  
supporting use of a client response template to create a first-service-provider  
response in accordance with certain embodiments. Arrow **3670** directs the flow of  
execution from starting operation **2704** to operation **3672**. Operation **3672**  
20 performs invoking one of the client response templates in conjunction with the  
processed, received client service query message. Arrow **3674** directs execution  
from operation **3672** to operation **3676**. Operation **3676** performs responding by  
first service provider to invoked client response template and processed,  
received client service query message to create the first-service-provider  
25 response. Arrow **3678** directs execution from operation **3676** to operation **3680**.  
Operation **3680** terminates the operations of this flowchart.

Figure **92** depicts a flowchart of operations embodied in a first message interface  
to support maintaining a collection of client problem templates in accordance with  
certain embodiments. Operation **3700** starts the operations of this flowchart.  
30 Arrow **3702** directs the flow of execution from operation **3700** to operation **3704**.  
Operation **3704** performs receiving the client problem template from service-flow  
engine. Arrow **3706** directs execution from operation **3704** to operation **3708**.

5 Operation **3708** performs processing the received client problem template to create a processed, received client problem template. Arrow **3710** directs execution from operation **3708** to operation **3712**. Operation **3712** performs adding the processed, received client problem template to the collection of client problem templates. Arrow **3714** directs execution from operation **3712** to  
10 operation **3716**. Operation **3716** terminates the operations of this flowchart.

Figure **93** depicts a flowchart of further details of operation **2604** of Figure **53** supporting use of a client problem template to create an educated service query using a first service interface in accordance with certain embodiments. Arrow **3730** directs the flow of execution from starting operation **2604** to operation **3732**.  
15 Operation **3732** performs invoking one of the client problem templates. Arrow **3734** directs execution from operation **3732** to operation **3736**. Operation **3736** performs responding by client to invoked client problem templates to create the educated query message. Arrow **3738** directs execution from operation **3736** to operation **3740**. Operation **3740** terminates the operations of this flowchart.

20 Figure **94** depicts a flowchart of operations embodied in a service profiler process performed by a service-flow engine to generate and send client problem templates to clients in accordance with certain embodiments. Operation **3760** starts the operations of this flowchart. Arrow **3762** directs the flow of execution from operation **3760** to operation **3764**. Operation **3764** performs generating a client problem template from the client service profile. Arrow **3766** directs  
25 execution from operation **3764** to operation **3768**. Operation **3768** performs sending the client problem template to the client at the corresponding client address. Arrow **3770** directs execution from operation **3768** to operation **3772**. Operation **3772** terminates the operations of this flowchart.

30 Figure **95** depicts a flow diagram of a service profiler process in accordance with certain embodiments. Box **3800** designates a Service Profiler Process Dispatcher. This communicates via physical transport mechanism **3802** to

5 network **3804**. Box **3808** designates Service profiler sub-process 1 on service-flow engine **1**, performing the operation **2630** of Figure **54**. This communicates via physical transport mechanism **3806** to network **3804**. Box **3812** designates Service profiler sub-process 2 on service-flow engine 2, performing the operation **2740** of Figure **57**. This communicates via physical transport mechanism **3810** to  
10 network **3804**. Box **3816** designates Service profiler sub-process 3 on service-flow engine 3, performing the operation **3040** of Figure **69**. This communicates via physical transport mechanism **3814** to network **3804**. Box **3820** designates Service profiler sub-process 4 on service-flow engine 4, performing the operation **3270** of Figure **76**. This communicates via physical transport mechanism **3818** to  
15 network **3804**. Box **3824** designates Service profiler sub-process 5 on service-flow engine 5, performing the operation **3470** of Figure **84**. This communicates via physical transport mechanism **3822** to network **3804**. Box **3828** designates Service profiler sub-process 6 on service-flow engine 6, performing the operation **3490** of Figure **85**. This communicates via physical transport mechanism **3826** to  
20 network **3804**. Box **3832** designates Service profiler sub-process 7 on service-flow engine 7, performing the operation **3760** of Figure **94**. This communicates via physical transport mechanism **3830** to network **3804**.

Note that in certain alternative embodiments, collections of these sub-processes may preferably reside on a single service-flow engine. Note that in certain other  
25 embodiments, multiple service-flow engines may be performing a given sub-process.

Figure **96** depicts a flow diagram of a computer program capable of receiving a message from a service provider containing a service recommendation and responding to the message containing the service recommendation in  
30 accordance with an aspect of the invention. Operation **3850** starts the operations of this flowchart. Arrow **3852** directs the flow of execution from operation **3850** to operation **3854**. Operation **3854** performs receiving the client message with an embedded service recommendation. Arrow **3856** directs execution from

5 operation **3854** to operation **3858**. Operation **3858** performs displaying the received client message with embedded service recommendation. Arrow **3860** directs execution from operation **3858** to operation **3862**. Operation **3862** performs responding to the client message with embedded service recommendation. Arrow **3864** directs execution from operation **3862** to operation  
10 **3866**. Operation **3866** terminates the operations of this flowchart.

Figure **97** depicts a flowchart of further details of the code of **3854** of Figure **96** supporting receiving a client message with an embedded service recommendation in accordance with certain embodiments. Arrow **3880** directs the flow of execution from starting operation **3854** to operation **3882**. Operation  
15 **3882** performs receiving an encrypted client message with embedded service recommendation. Arrow **3884** directs execution from operation **3882** to operation **3886**. Operation **3886** performs processing the received, encrypted client message with embedded service recommendation to create the received client message with embedded service recommendation. Arrow **3888** directs  
20 execution from operation **3886** to operation **3890**. Operation **3890** terminates the operations of this flowchart.

Figure **98** depicts a flowchart of further details of the code of **3862** of Figure **96** supporting responding to the client response message in accordance with certain embodiments. Arrow **3900** directs the flow of execution from starting operation  
25 **3862** to operation **3902**. Operation **3902** performs generating a client service recommendation message from said embedded service recommendation. Arrow **3904** directs execution from operation **3902** to operation **3906**. Operation **3906** performs sending said client service recommendation message to said service-flow engine. Arrow **3908** directs execution from operation **3906** to operation  
30 **3910**. Operation **3910** terminates the operations of this flowchart.

Figure **98A** depicts a flowchart of further details of **3311** of Figure **78** supporting integrating a service order in accordance with certain embodiments.

5 Arrow **3920** directs the flow of execution from starting operation **3311** to operation **3922**. Operation **3922** determines if the received client response message contains an embedded service recommendation. Arrow **3924** directs execution from operation **3922** to operation **3926**. Arrow **3924** directs execution when the determination is ☐Yes☐ to operation **3926**. Arrow **3954** directs execution  
10 when the determination is ☐No☐ to operation **3946**.

Operation **3926** performs receiving the client service order message from the first client. Arrow **3928** directs execution from operation **3926** to operation **3930**. Operation **3930** determines if the client service order message from the first client is compatible with the embedded service recommendation contained in the  
15 received client response message. Arrow **3932** directs execution from operation **3930** to operation **3934**. Arrow **3932** directs execution when the determination is ☐Yes☐ to operation **3934**. Arrow **3956** directs execution when the determination is ☐No☐ to operation **3946**.

Operation **3934** determines if the client service order received from the first client  
20 authorizes the service order. Arrow **3936** directs execution from operation **3934** to operation **3938**. Arrow **3936** directs execution when the determination is ☐Yes☐ to operation **3938**. Arrow **3958** directs execution when the determination is ☐No☐ to operation **3946**.

Operation **3938** determines a first pharmacy from the client service order. Arrow  
25 **3940** directs execution from operation **3938** to operation **3942**. Operation **3942** performs generates and sends the service order message to the first pharmacy based upon the received client response message and the received client service order message. Arrow **3944** directs execution from operation **3942** to operation **3946**. Operation **3946** terminates the operations of this flowchart.

30 Figure **98B** depicts a flowchart of further details of **3324** of Figure **78A** supporting generating a pharmacy service order in accordance with certain embodiments.

5 Arrow **3960** directs the flow of execution from starting operation 1324 to  
operation **3962**. Operation **3962** determines if the processed, received client  
service order is compatible with the processed, received service provider service  
recommendation. Arrow **3964** directs execution when the determination is 'Yes'  
to operation **3966**. Arrow **3978** directs usage when the determination is 'No' to  
10 operation **3970**.

Operation **3966** generates a pharmacy service order message from the  
processed, received service provider service recommendation message and the  
processed, received client service order. Arrow **3968** directs execution from  
operation **3966** to operation **3970**. Operation **3970** terminates the operations of  
15 this flowchart.

Figure **98C** depicts a flowchart of further details of **3326** of Figure **78A** supporting  
sending a pharmacy service order to a pharmacy in accordance with certain  
embodiments.

Arrow **3980** directs the flow of execution from starting operation **3326** to  
20 operation **3962**. Operation **3962** determines if the processed, received client  
service order is compatible with the processed, received service provider service  
recommendation. Arrow **3984** directs execution from operation **3962** to operation  
**3986**. Arrow **3984** directs execution when the determination is ☐Yes☐ to operation  
**3986**. Arrow **3998** directs usage when the determination is ☐No☐ to operation  
25 **3994**.

Operation **3986** performs determine the first pharmacy from the processed,  
received client service order. Arrow **3988** directs execution from operation **3986**  
to operation **3990**. Operation **3990** performs sending the pharmacy service order  
message to the first pharmacy. Arrow **3992** directs execution from operation  
30 **3990** to operation **3994**. Operation **3994** terminates the operations of this  
flowchart.



5 Figure **98D** depicts a flowchart of further details of **3106** of Figure **71** supporting determining a routing chain of service extenders and embedding the routing chain into a second client query in accordance with certain embodiments.

Arrow **4010** directs the flow of execution from starting operation **1106** to operation **4012**. Operation **4012** determines a routing chain of service extenders.

10 Arrow **4014** directs execution from operation **4012** to operation **4016**. Operation **4016** embeds the routing chain of service extenders into the second service query. Arrow **4018** directs execution from operation **4016** to operation **4020**. Operation **4020** terminates the operations of this flowchart.

15 Note that a routing chain of service extenders is a collection of at least one service extender to whom the second client query will be routed after the first service extender has added their proposed response to the client query.

Figure **98E** depicts a flowchart of further details of **3178** of Figure **72** supporting determining successor service extenders in an embedded service extender routing chain, generating a successor service query message with embedded  
20 proposed client response and sending the successor client service query to the successor service extender.

Arrow **4030** directs the flow of execution from starting operation **1178** to operation **4032**. Operation **4032** determines if there is a successor service extender in the embedded service extender chain. Arrow **4034** directs execution  
25 from operation **4032** to operation **4036**. Arrow **4034** directs execution when the determination is ☐Yes☐ to operation **4032**. Arrow **4048** directs execution when the determination is ☐No☐ to operation **4044**.

Operation **4036** generates the successor service query message with the embedded proposed client response. Arrow **4038** directs execution from  
30 operation **4036** to operation **4040**. Operation **4040** send the successor client service query to the successor service extender. Arrow **4042** directs execution

5 from operation **4040** to operation **4044**. Operation **4044** terminates the operations of this flowchart.

Figure **98F** depicts a flowchart of further details of **2646** of Figure **54** supporting generating a routing tree of service providers with first service provider final destination and source list of service providers, generating and sending a source  
10 service query to each service provider included in the service provider source list.

Arrow **4060** directs the flow of execution from starting operation **646** to operation **4062**. Operation **4062** performs generating a routing tree of service providers with the first service provider the final destination of the routing tree and a source list of service providers of the routing tree. Arrow **4064** directs execution from  
15 operation **4062** to operation **4066**. Operation **4066** performs generating and sending a source service query for and to each service provider belonging to the source list of the routing tree. Arrow **4068** directs execution from operation **4066** to operation **4070**. Operation **4070** terminates the operations of this flowchart.

20 This disclosure is provided to reveal a embodiment of the invention and a best mode for practicing the invention. However, one skilled in the art will readily appreciate that other approaches may be substituted for those set forth herein without departing from the spirit and scope of the present invention. Further, additional advantages, applications and modifications of the invention will readily  
25 occur to those skilled in the art. Accordingly, the invention should only be limited by the claims included below.